Cape Peninsula University of Technology

Strategies used by organisations to evaluate the skills and competencies of IT graduates in Cape Town, South Africa

by

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DECLARATION

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

1 December 2022

Signed **Date**

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ABSTRACT

The misalignment between industry and the workplace has been a topic of research and exploration for many years. This disconnect has an impact on graduate employability skills and what industry expects of graduates to possess when they enter the workplace. Employers are dissatisfied when graduates enter the workplace. Graduates are put through various company-specific tests to confirm their technical, interpersonal and culture ability for employment. However, graduates are not prepared for these tests.

This study endeavoured to answer the following questions:

i) What criteria are used for identifying graduates for placements in IT companies?
ii) How are tests articulated to successfully employ a quality graduate?

The aim of the study was to explore how organisations determine the fit (knowledge, skills, logic and problem-solving ability) of the IT graduate when applying for a position within the company. Interviews were used to collect data using semi-structured interview questions. Interviewees were non-random and conveniently selected using a snowballing method. Data were analysed, summarised, categorised and a thematic analysis was done.

This research contributes to the body of knowledge by understanding how organisations determine the fit (knowledge, skills, logic and problem-solving ability) of the IT graduate when applying for a position within a company and determining what their strategies are in doing so. The findings can be used by employers and employees for future employment.

The study reveals that testing is unique to a company and the requirements associated with the needs of the organisation. While testing does have clear advantages, there are disadvantages noted and various competencies that graduates do not possess when entering the workplace. The lack of competencies needs to be addressed at various stages of the graduates' technical, behavioural and cultural grooming. Testing is being done, but graduates are intimidated by the process that has not been standardised and where little collaboration between industry and curriculum exists to groom graduates for the recruitment process, which includes testing. To maintain the integrity of CPUT, strong ethical and moral principles were adhered to. Consent was obtained, prior to data collection, in writing from the companies as well as the participants.

Keywords: Software development graduates, screening, lack of skills, required skills, critical skills, quality graduate.

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ABBREVIATIONS

Abbreviation	Full Word/Term
CPUT	Cape Peninsula University of Technology
CTO	Chief Technical Officer
GP	Graduate Participant
HR	Human Resources
HRM	Human Resource Manager
HRP	Human Resource Participant
IT	Information Technology
IQ	Interview Question
ODM	Organisational Development Manager
RQ	Research Question
SSP	Senior Staff Participant
SD	Software Development
RSQ	Research Sub-Question

DEFINITIONS

Word/Term	Definition	Source
Adaptive skills	"These skills help you function in a new situation, for example flexibility. They are enthusiasm, honesty and getting along well with people."	Omoniwa and Adedapo (2017:63)
Characteristics	Characteristics are categorised as "business fundamentals, analytical and critical thinking, interpersonal, communication and team skills, and technology". The characteristics of an individual refer to "intellectual, managerial, social and emotional skills".	Plice and Reinig (2007:24) Khampirat, Pop and Bandaranaike (2019:131)
Generic skills	"Generic or transferable skills such as communication, problem-solving, personal qualities, metacognition and team skills which relate to the management of self, others, information or tasks."	Clark (2018:1925)
Graduate employability	Employability refers to "the ability of an individual to gain employment appropriate to his/her educational standard". Employability is defined as "a set of achievements – skills, understanding and personal attributes – that make graduates more likely to gain development and be successful in their chosen occupation, which benefits themselves, the workforce, the community and the economy".	Wickramasinghe and Perera (2010:226) Butum and Nicolescu (2019:74)
Learning	"The process whereby knowledge (the result of the combination of grasping and transforming experience) is created through the transformation of experience."	Rajadurai, Sapuan, Daud and Abidin (2018:138)
Personal skills	"Personal skills are attributes such as being responsible, resourceful and self-confident."	Alshare and Sewailem (2018:2)
Problem-solving	"The ability to process information, think systematically and make correct decisions in both routine and unusual problems in a workplace that requires critical thinking skills to assess the problem."	Siddoo et al. (2019:e01723)
Quality graduate	A quality graduate is "when the competencies set out by higher institutions meets the requirements of the workplace."	Kruhlyk (2017:71)
Recruitment	Recruitment is defined as "the firm-specific capabilities to identify and access individual expert competencies developed in external firms and institutions, and the processes of selecting and integrating these into the cognitive domains of the firm."	Joranli (2018:184)
Screening tests	Screening tests are "part of the recruitment process required when employing potential employees."	Fulgence (2015:198)

Word/Term	Definition	Source
Soft skills	Soft skills are described "as character traits that enhance a person's interactions, job performance, and career prospects the greatest feature of soft skills is that they are intangible and are not discipline specific, that is the application of these skills is not limited to one's profession" (Omoniwa & Adedapo, 2017:63). Soft skills are defined as "non-job specific skills that are related to individual ability to operate effectively in the workplace" and also "skills that are cross-cutting across jobs and sectors and relate to personal competences (confidence, discipline, self-management) and social competences (teamwork, communication, emotional intelligence)."	Omoniwa and Adedapo (2017:63) Gabor, Blaga and Matis (2019:4)
Technical competencies	"Technical competencies are defined as the ability to choose and apply an integrated combination of knowledge with the intention to realise a certain task in a certain context."	Akman and Turhan (2018:201)
Transferable skills	"These are personal abilities, characteristics or skills that transfer or can be used from one job or situation to another."	Omoniwa and Adedapo (2017:63)
Work readiness	Work readiness can be defined as "the extent to which graduates are perceived to possess the attitudes and attributes that make them prepared or ready for success in the work environment".	Magagula, Maziriri and Saurombe (2020:4)

CHAPTER 1: INTRODUCTION

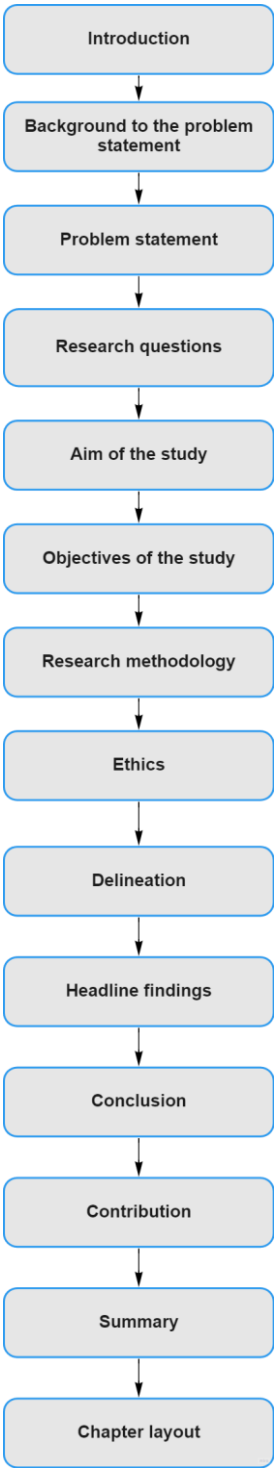


Figure 1.1: Layout of Chapter 1

1.1 Introduction

The misalignment between industry and university information technology (IT) curricula has been discussed for many years. Many studies have been done to establish what industry deems as relevant and what universities see as relevant (Healy, Brown & Ho, 2021; Baird &

Parayitam, 2019; Garousi, Giray, Tüzün, Catal and Felderer, 2019; Tan & Paul, 2018; Tuzun, Erdogmus & Ozbilgin, 2018). Garousi, Giray, Tüzün, Catal and Felderer (2020) mention that the misalignment between industry and universities is a quality issue, with emphasis placed on the theory and technical topics instead of project management, communication skills and professionalism.

The development of students' employability is more effective and covers a wider range of skills if professionals in the workplace are intentional about their role in cultivating fertile learning environments as the students' journey through university into the workplace (Healy et al., 2021). Institutions provide students with the necessary capabilities for their careers but measuring the graduate's uptake and application of said sustainability capabilities is important in creating a sustainable curriculum to educate future students (Sandri, Holdsworth & Thomas, 2018). Sandri et al. (2018) argue that there is a need for measuring graduate capabilities post-degree completion.

The successful completion of a degree does not guarantee employment (Hora, 2020). The recruitment process of graduates is complex. Graduates are still required to undergo training within the workplace irrespective of receiving good grades during their studies (Lundberg, Krogstie & Krogstie, 2021). According to Briedis, Chen and Markel (2019), most graduates have not been exposed to working in the industry and therefore graduates may not be familiar with various tools or processes used by the company. Little is known whether the recruitment process is suited to successfully employ a graduate.

This research explores how organisations determine the fit of the IT graduate when applying for a position within the company by means of a multiple case study (8 companies) with 21 participants being interviewed.

This chapter covers: i) an introduction of the study, ii) background to the problem statement, iii) the problem statement, iv) research questions, v) the aim the research addresses, vi) research objectives, vii) research methodology, viii) ethics, ix) delineation of the research, x) research contribution, xi) summary and xii) the layout of the thesis.

1.2 Background to the problem statement

The entry-level tests (screening tests) need to be successfully completed by the applicant (student; knowledge, skills, logic and problem-solving ability) at organisations before a job offer is made, seem to be far removed from what the student is prepared for (Harun, Salleh, Baharom & Memom, 2017). Graduates are an important part of the labour force, but companies have become more selective over their assessment of skills.

Employers are generally not satisfied with the performance of the IT graduates once appointed in the company (Alshare & Sewailem, 2018). Damoah, Peprah and Brefo (2021) agree and say that employers are not satisfied with the employability skills when graduates enter the workplace. Tseng, Yi and Yeh (2019) mention that more attention should be placed on simulating business and real-world situations that allows students to be exposed to real-life problem-solving. Employers look for interpersonal skills and problem-solving ability before their final decision to employ a graduate. This means that universities need to pay close attention to enhancing these skills by including teamwork in the curriculum (Baird & Parayitam, 2019).

There is a gap between the expectation of employers and the level of IT education that the graduates receive (Suleman & Costa Laranjeiro, 2018). Hiring managers could address the lack in knowledge, by adjusting the interview process when hiring graduates and identify the missing competencies within the workplace and hire accordingly (Garousi et al., 2019). Many companies, evaluating these graduates, have their own in-house “pre” interview “job screening” tests that the graduate needs to complete. Based on the results of the testing, the graduate may or may not be offered a position in the company.

Healy et al. (2021) mention that employability of graduates is complex and involves various aspects that can only be achieved if they have industry and academia to support it. It is a given that the experienced professionals in the workplace contributes towards the graduates’ success both professionally and personally and universities are required to invest more resources into employability strategies (Healy et al., 2021).

There is a gap between the development and assessment of the graduates’ employability skills since there seems to be limited resources available to assess the graduates’ ability to think critically, to solve problems, and the graduates’ ability of written communication (Sarkar, Overtan, Thompson & Rayner, 2020). Very little attention is given to understand what industry defines as a quality graduate and how they go about to determine this. Furthermore, there is a lack of research to show how these graduates are being tested for competency, who is setting these tests, and whether these tests add value to the employment of graduates. A students’ ability to master their knowledge acquired during their studies and applying that knowledge in the workplace is an important topic of research (Hong, Yang, Wen, Song, Shi, Chen & Hu, 2022).

1.3 Problem statement

It is unclear what constitutes a quality graduate and how the industry tests graduates and determine their fit when entering the workforce.

1.4 Research questions

The following research questions (RQs) and research sub-questions (RSQs) have been formulated to explore the relevance of company-specific tests for IT appointments in Cape Town (Table 1.1).

Table 1.1: Research questions, research sub-questions, objectives and methodologies

RQ1	**What criteria are used for identifying graduates for placements in IT companies?**		
	Question	**Objective**	**Methodology**
RSQ 1.1	What are the characteristics and skills a company uses to define a quality graduate?	To determine what characteristics and skills the company have identified to define a quality graduate.	Semi-structured questionnaire
RSQ 1.2	What company tests are done by graduates before entering employment?	To determine the criteria used in the filtering of applications and then choosing a certain graduate/s to interview.	Semi-structured questionnaire
RSQ 1.3	What are the advantages and disadvantages of using the organisation's tests to determine the fit of the graduate to the company?	To determine whether this method of testing is beneficial to the organisation and the graduate, and whether these tests are changed based on favourable and unfavourable outcomes.	Semi-structured questionnaire
RQ2	**How are tests articulated to successfully employ a quality graduate?**		
	Question	**Objective**	**Methodology**
RSQ 2.1	How do companies determine the characteristics and skills required for the position the graduate is applying for?	To evaluate whether the tests meet the criterion mentioned that is used to determine fit for employment.	Semi-structured questionnaire
RSQ 2.2	How do companies determine which tests are suited for the position the graduate is applying for?	To determine which factors or criteria are used to formulate the tests used by the company to ensure that the graduate fits the description of the skills needed by the company.	Semi-structured questionnaire
RSQ 2.3	How is the success of the evaluation strategy measured post-employment of the graduate?	To determine whether the tests are evaluated after employment to ensure that tests are constantly updated to align with the company's evaluation strategy.	Semi-structured questionnaire

*RSQ - Research sub-question

1.5 Aim of the study

The aim of the study was to explore how organisations determine the fit (knowledge, skills, logic and problem-solving ability) of the IT graduate when applying for a position within the company.

1.6 Objectives of the study

The objective of the study was to determine what tests are taken by the information technology (IT) graduates before they are employed as part of their application process. This study endeavoured to examine how these tests or methods confirm that the software development (SD) graduates being employed are quality graduates. A further objective was to determine how these tests are developed and constructed.

1.7 Research methodology

1.7.1 Introduction

Research methodology is the framework that is applied to research data acquired during collection and the analysis of that data to create or add knowledge (Bilau, Witt & Lill, 2018:599). There are various research methods, but the chosen research method should be driven by the research questions, aims and objectives as presented in the study (Bilau et al., 2018). Chapter 3 presents a detailed discussion of the research methodology followed in this study.

1.7.2 Research philosophy

A research philosophy makes important assumptions about how you view the world, which is essential in identifying the research strategy and methods of a research study. The chosen philosophy is "influenced by practical considerations but the main influence is however, by your particular view of the knowledge and how it has been developed" (Saunders, Lewis & Thornhill, 2009:108). In the following subsections, the ontological and epistemological stance is briefly discussed.

1.7.2.1 Ontology

i) Subjectivism

Subjectivism is the belief that social phenomena forms from the perceived notions and actions of social actors (us and others) (Saunders et al., 2009). Subjective research follows a subjective approach whereby it is imperative to understand what motivates social actors to act in a certain way whereby the social actors may interpret situations very differently within the situations they find themselves.

ii) Objectivism

Objectivism is an approach that "asserts that social phenomena and their meanings have an existence that is independent of social actors" (Bryman, Bell, Hirschsohn, Dos Santos, Du Toit & Masenge, 2014:46). Objectivity implies that there is a tangible object or organisation that has a certain structure. This structure or set of procedures do not form part of the individuals that occupy the organisation (Bryman et al., 2014). An objective view believes the social world is truly made up of unchanging factors such as family, religious beliefs and the economy individuals are born into.

1.7.2.2 Epistemology

i) Positivism

Positivism adopts the philosophical attitude of a natural scientist allowing the phenomena being observed to lead to trustworthy data (Saunders et al., 2009). Positivism is reliant on the researchers' trustworthiness and integrity since positivism is based on realism which is the "belief that reality exits" and is in search of the truth (Killam, 2013:28). It embraces the nature around us i.e., "the reality the scientist wishes to address" (Goles & Hirschheim, 2000:252). Positivism seeks to understand and explain what happens in the natural world by exploring its similarities and normative relationships between various elements (Goles & Hirschheim, 2000).

ii) Interpretivism

Interpretivism aims to understand and interpret human behaviour. It relies on qualitative data and assumes that truth is what people perceive it to be (Johnson, Holness, Porter & Hernandez, 2018:3). Interpretivists view knowledge as socially constructed and complex in nature, and recognise that those who are participating in the research play a vital role (Babbie & Mouton, 2015:28). An interpretivist rational view is that the researcher's experiences influence the object being studied since the researcher's background shapes interpretations of the discussions being done during the research (Bilau et al., 2018; Dean, 2018). An interpretivist view is appropriate in business research especially in research that involves organisational behaviour and human resource management (Saunders et al., 2009). The interpretivist is "constantly interpreting, creating, defining, justifying and rationalising our actions in the quest to make sense of life" (Babbie & Mouton, 2015:28).

This research used an interpretivist research philosophy and aimed to understand what strategies are used by organisations to evaluate the skills and competencies of graduates when entering the workplace.

1.7.3 Research approach

The inductive approach focuses on understanding the nature of the problem and building a theory. The goal is to analyse the data received in order to formulate a theory. This approach also lends itself to understanding how humans interpret the social world. Unlike the deductive approach that is "theory-driven hypothesis testing, verification orientated", the inductive approach uses organised observation to create meaningful and congruent explanations when developing theories (Gelo, Braakmann & Benetka, 2008). This research adopted the inductive research approach in order to understand the nature of the problem, build a theory based on the various discussions observed, and conceptualise the understanding of the problem.

1.7.4 Research strategy

This study used multiple case studies to gather data through interviews to gain a thorough understanding of the context and processes that were put in practice. The research strategy aims to generate answers to the "why", "what" and "how" questions and is often used in both explanatory and exploratory research (Saunders et al., 2009). Study questions take on the form of "who", "what", "where", "how" and "why" so as to give insight as to which the most relevant research method is and the "how" and "why" are more suitable to a case study (Yin, 2003). A multiple case study establishes whether the findings from one case study can be found in another so as to generalise the findings. The case study approach strives to challenge existing theories and provide new research questions and insights.

1.7.4.1 Sampling

The eight (8) companies that took part in the study were selected from any industry that employs IT graduates. Non-random, convenient and purposively selected sampling was employed based on the researcher's subjective acumen (Saunders et al., 2009). Once the companies were identified and agreed to participate in this research, the staff involved in testing and recruiting of IT graduates were interviewed. Twenty-one (21) interviews were conducted with six (6) senior staff, five (5) staff from HR, and ten (10) graduates.

1.7.4.2 Unit of analysis

A unit of analysis refers to the "what" of the research being done. The unit of analysis can refer to an object, event, person or process that the researcher is interested in to research. This study made use of an empirical research unit of analysis, focusing on understanding human involvement or reasoning when applying a process or thought (Babbie & Mouton, 2015). Thus, for this study, the unit of analysis was eight (8) companies.

1.7.4.3 Unit of observation

The unit of observation refers to who will be answering the research questions posed by a study. This research interviewed five (5) human resource managers (HRMs), six (6) senior staff members involved in the recruitment of graduates, and ten (10) graduates. These units of observation were non-randomly, conveniently, and purposively selected to ensure that the data collected would answer the questions set out to be answered in this research.

1.7.5 Data collection

This study used semi-structured questionnaires with an interview guide to guide the interviews (Appendix D). Semi-structured interviews offer the interviewee the freedom to respond to the question without having to choose an answer. It also allows the interviewer to ask questions that are not part of the initial questions, being led by the responses of the interviewee (Bryman et al., 2014). The interview guide is linked to the research questions, research sub-questions,

and interview questions. Interviews were recorded with prior permission from those who participated in this study.

Once consent letters and permission were attained, the interview guide was sent to the participants to familiarise themselves with the questions before the interview was scheduled. This granted the participants the opportunity to think about the questions and prepare their answers before the interview took place. Interviews were conducted until data saturation was reached.

1.7.6 Data analysis

Each interview was recorded and transcribed afterwards. Transcriptions were sent to participants for validation and content correctness. Next, data analysis was conducted by reading, coding and re-reading transcriptions to ensure that the coding was done correctly and that the data were sufficient. Further analysis was then done by i) summarising each question answered by the participant, ii) categorising the summarised data, and iii) developing themes from the identified categories.

1.8 Ethics

Ethics refers to ensuring the "care of legal or regulatory requirements along with moral and ethical norms and practices", which should be considered from research design to analysing the findings (Mukherjee, 2020:3). The ethical and confidential issues surrounding research are of the utmost importance to protect all participants involved in the research. Participation must be "voluntary and participants must not feel as though they are forced to be part of the study" (Babbie & Mouton, 2015:521). Researchers have the right to interview participants, but the participants have the right to confidentiality (Babbie & Mouton, 2015:520). Confidentiality and anonymity protect the participants' right to privacy and ensure that their identity remains protected (Sachdeva, 2008). This meant that all participants' rights have to be adhered to as stated in the Constitution of South Africa. All ethical principles prescribed by CPUT have been adhered to.

Ethical codes and rules are set by professional institutions that govern the processes and rules for ethical research (Weathington, Cunningham & Pittenger, 2012). The researcher is required to obtain informed consent from all participants in the study. However, ethics extend beyond the honesty of the researcher – participants need to be fully aware of all aspects of their involvement. Researchers are tasked with encouraging collaboration and building a mutually beneficial relationship with the participants in order to view one another as morally driven beings (Bryman et al., 2014).

The research process adhered to the following ethical principles:

i) **Ensured that no harm was done to any participants:** The purpose of the study and the intent of the participants' participation were explained to assure the participants that their input was voluntary and that they had the choice to retract from the study at any time.

ii) **Written consent of the willingness to taking part in the study was obtained from all participants:** The participants were informed prior to accepting participation that consent would be required to use their data in the thesis; consent was willingly received from all participants.

iii) **Participants were allowed to withdraw from the research at any time:** This was clearly explained in the consent letter sent to participants prior to the scheduling of interviews.

iv) **Participants were given the opportunity to validate their transcriptions:** All participants were sent their transcription and given the opportunity to validate their transcriptions.

v) **Ensured that all personal details, including names, email addresses, positions and contact numbers, will be kept confidential to ensure the protection of their anonymity:** None of the participants' real names, company name, email address, and contact information was used in the thesis. Participants were given pseudo names and companies were presented as Company 1–8.

vi) **Served the needs of the Cape Town community in a respectful manner:** This research respectfully ensured that participation was anonymous and courteous, and that the respondents' inputs added to the intent of ensuring that graduates, institutions and organisations receive information that assists with the employment of the future workforce.

Interview questions were submitted to the Ethics committee of CPUT for scrutiny and approval. The aim and objective of the study were explained to participants to ensure a clear understanding of what the research endeavoured to undertake. Confidentiality of the participants' organisation and names were explained, i.e., no details of the participants' organisation or their personal information would be mentioned in the research outputs.

1.9 Delineation

This study was done in Cape Town, Western Cape Province of South Africa, geared towards organisations that employ graduates using various tools, methods and/or strategies. The research made the assumption that the selected organisations employ graduates, and as such, that these organisations would be able to answer the questions posed during the interviews. Job designations outside of the IT field, such as administrative tasks, accounting and management, were excluded from this research. Job designations other than those directly

within the IT field were outside the scope of this research. All other provinces were excluded from the study due to time constraints and the challenge of finding organisations to participate in the research.

1.10 Headline findings

Key findings, as highlighted by the data collection and analysis, are as follows:

i) There is little involvement from industry to standardise tests or to bridge the gap between what the graduate learns and what is expected when the graduate enters the workplace.

ii) A quality graduate is defined as a graduate who takes initiative, is willing to learn and has the ability to solve problems, which links to the company's characteristics and skills required when a graduate enters the workplace; however, these skills are still lacking when graduates enter the workplace.

iii) Key disadvantages identified include the following: i) graduates feel intimated while being tested because they are not adequately prepared for the recruitment process, ii) testing does not fully assess the graduates' ability, and iii) tests are too technical, with unrealistic expectations.

1.11 Conclusion

The study revealed that testing is unique to a company and to the requirements associated with the needs of the company. While testing does have clear advantages, there are also disadvantages. Furthermore, graduates lack various important competencies when entering the workplace. This lack of competencies needs to be addressed at various stages during the graduates' technical, behavioural and cultural grooming. These findings are presented in Chapter 4, discussed in Chapter 5 and concluded in Chapter 6.

1.12 Contribution

This research contributes as follows:

1.12.1 Body of knowledge

The research adds to the body of knowledge by exploring: i) how organisations determine the fit (knowledge, skills, logic and problem-solving ability) of the IT graduate when s/he applies for a position in the company, and ii) what the strategies of these companies are in employing (or not employing) a quality graduate. A further contribution to the body of knowledge is an analysis of how these tests are constructed and why they are seen as important in the successful employment of a graduate.

1.12.2 Practical contribution

This research offers insight into what companies use as their benchmark for employing graduates and how they derive success from these benchmarks. The outcomes of this research may assist in understanding what is required from the graduate and how higher education institutions can better equip the graduate to be successful in the workplace. The outcomes may help organisations understand what the entry-level of the graduate is and how they, as the organisation, can develop the graduate and provide feedback to the educational institution to bridge the gap of curriculum versus industry requirements.

1.13 Summary

This chapter introduced the research and stated the research problem, aim of the research, RQs, RSQs and objectives of the study. It further explained why this research has been conducted and how the findings and exploration contribute to the larger body of knowledge. The chapter highlighted the research methodology used, provided an overview of the research strategy, and explained the data collection and analysis process done to extract findings.

This study adopted an interpretivist stance. Multiple case studies (8 cases) were used to generate responses. These responses were collected through semi-structured questionnaires using an interview guide to direct the interviews performed with twenty-one (21) participants across the eight (8) companies. Interviews were transcribed, reviewed and analysed, and themes were formulated. Research was conducted based on the ethical codes as stipulated by CPUT, including keeping participants' information anonymous and confidential, with no participant being harmed during the process.

To conclude, the findings indicate that employability skills (problem-solving, critical thinking, interpersonal skills, technical skills, willingness to learn, and work experience) are still lacking when graduates enter the workplace. Testing is being done by companies, but graduates are intimidated by the process that has not been standardised and where little collaboration between industry and curriculum exists to groom graduates for the recruitment process.

1.14 Chapter layout

The thesis is presented in the following chapters:

Chapter 1: Introduction

The introductory chapter introduces the thesis by giving an overview of the background, the aim and objectives of the study, and the research methodology adopted by the research.

Chapter 2: Literature review

This chapter presents the literature review during the study.

Chapter 3: Research methodology

This chapter presents the research design and methods focused on during the study.

Chapter 4: Data analysis and findings

In this chapter, the data obtained during interviews are analysed and findings documented. These findings are grouped into themes for discussion in Chapter 5.

Chapter 5: Discussion

Chapter 5 discusses the findings by addressing the research questions using the themes articulated in Chapter 4.

Chapter 6: Conclusion, recommendations and future research

This chapter concludes the study and offers recommendations and future research from the researcher's observation during the course of the study.

In the next chapter (Chapter 2), the literature review informing the research is presented.

CHAPTER 2: LITERATURE REVIEW

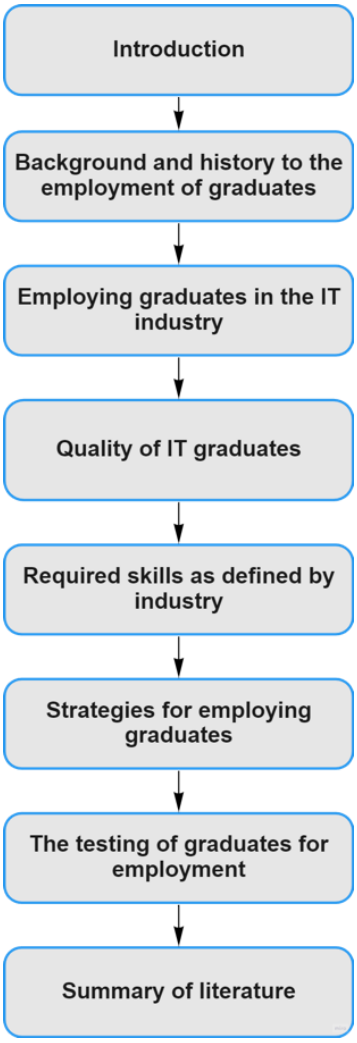


Figure 2.1: Layout of Chapter 2

2.1 Introduction

The misalignment between industry and education institution curriculum has been discussed and scrutinised for many years. Multiple studies have been done to establish what industry deems as relevant when graduates enter the workplace and what universities see as relevant when graduates leave the education institution (Sarkar et al., 2020; Garousi et al., 2019; Tan & Paul, 2018; Tuzun et al., 2018). Only a few studies have been done on what methods software graduates are exposed to that verify that they can do the job they have applied for (Baird & Parayitam, 2019; Harun et al., 2017).

Garousi et al. (2019) mention that a quality issue could be the reason for the misalignment between industry and universities and that emphasis is placed on the theory and technical topics instead of project management, communication skills and professionalism. Experts

recommend that students focus on technical and soft skills (Sultana & Reed, 2018). There is also an over-emphasis on certain subjects such as mathematics and engineering (Garousi et al., 2019).

Twinomurinzi, Schoefield, Hagen, Molefe and Tshidzumba (2017) posit that graduates require an extra “ready for industry” course as part of their studies. The effectiveness of training at universities is evident once the graduates are employed and where the level of the graduate’s knowledge will always be increasing (Kruhlyk, 2017). Tan and Paul (2018) mention that the high costs of tertiary education place great pressure on the institutions to deliver high-quality degrees to students. However, the quality is still in question. Too much value is still placed on technical skills and not soft skills or work experience as indicated by IT leaders (AlGhamdi, 2019).

A shortage of skills is a growing problem that can be bridged by introducing work integrated learning that is supported by both industry and universities (Tamin, Du Plooy, Von Solms & Meyer, 2019). There is a need for measuring graduate capabilities post-degree completion (Sandri et al., 2018). Institutions provide students with the necessary capabilities for their careers, but measuring the graduate’s uptake and application of sustainability capabilities is important in creating sustainable curricula to educate future students (Sandri et al., 2018).

There are many opinions on what the problem is when it comes to employing graduates (Healy et al., 2021; Garousi et al., 2019; Tan & Paul, 2018). Employers are also barely satisfied with the performance of graduates and suggest involving employers in the designing of the curriculum (Alshare & Sewailem, 2018). Furthermore, there is the concern about who in the organisation is actually employing the graduate and that HR should not be responsible for indicating that the graduate is employable (Hollister, Spears, Mardis, Lee, McClure & Liebman, 2017). Graduates should be assessed by persons who work with the graduates, who does the job and manages the graduate (Briedis et al., 2019; Hollister et al., 2017; Jaradat, 2017).

Many companies evaluating these graduates have their own in-house “job screening” tests that the graduate needs to complete. These screening tests range from the screening of the graduate’s CV to initial interviews, technical tests or other interviews to assess whether the graduate would fit within the organisation. Based on the results, the graduate may or may not be offered a position in the company.

Unfortunately, there is a lack of research to show how these graduates are being tested for competency and who is setting these tests. Research shows that there has been an increase in the need for testing on various aspects of employability (technical, behavioural, cultural and interpersonal). However, there is a lack of this kind of tests setup and who is involved (Rose,

Teo, Nguyen & Nguyen, 2021; Hora, 2020; Harun et al., 2017). Research also does not mention why these tests are needed, and after the graduate is employed whether these tests are useful and if there is a tool for predictability of success of the student in the organisation.

The literature review was done by using the keywords and concepts derived from the title, problem statement, research questions, aim of the study and keywords presented in relevant articles. An iterative process was followed to finalise the keywords and concepts used. These keywords and concepts were used as search terms for interrogating the online data basis of the Cape Peninsula University of Technology with special reference to Google Scholar, Elsevier Inc, EBSCOhost Academic Search Premier, SANLIC SpringerLink Journals, ProQuest, Gale Academic Online, Emerald Insight, Taylor and Francis Online, Routledge, IEEE Xplore, Wiley Online Library and ScienceDirect.

The chapter is presented as follows; i) background, ii) definitions, iii) employing graduates in the IT industry, iv) the quality of IT graduates, v) required skills as defined by industry, vi) strategies for employing graduates, vii) testing of graduates for employment, viii) theories, ix) conceptual framework, and x) summary.

2.2 Background and history to the employment of graduates

For the longest time there has been a discrepancy between the skills industry needs versus the skills graduates possess when they enter the workplace. This means that graduates are not ready for the workplace, according to Pertegal-Felices, Castejon-Costa and Jimeno-Morenilla (2014). They mentioned that graduates required higher levels of personal, social and emotional skills than what they possess. These results are also consistent with the results obtained for professional competencies that showed that employers demanded more skills than those acquired by graduates (Pertegal-Felices et al., 2014).

According to Chan Mow, Sasa, Maua-Faamau, Mauai and Tanielu (2015), most industry needs are met, but certain aspects need inclusion or better coverage at university level. The gap t mentioned is that graduates are not able to solve real-world computing problems, document their work properly or work well in teams, and that they often do not know what the best practices are in the workplace. O' Sullivan (2016) states that the most valuable skills are no longer the technical skills taught in the classroom. Technical skills are deemed less important than the skills that define the very core of who we are, such as working in groups or sensing the feelings of others or other soft skills. In more recent literature, Tseng et al. (2019) posit that teamwork allows students to interact with one another resulting in increased thinking and enhancement of soft skills.

According to Chillas, Marks and Galloway (2015), there is evidence that students are not prepared for industry. They also mention that there should be closer communication between industry and universities because relationship management and project management are becoming essential skills. O' Sullivan (2016) has undertaken to re-evaluate traditional industry and academic partnerships such as internships, work-study programs, guest lectures, curriculum advisory boards to identify gaps and opportunities.

O' Sullivan (2016:20) suggests more strategic relationships with industry to ensure i) a positive educational experience, ii) faster knowledge transfer, and iii) taking advantage of future technical and other environmental opportunities. There is a discrepancy between what the industry expects versus what is taught at university in terms of emotional abilities and personality which reinforces that students are not fully equipped for workplace entry (Pertegal-Felices et al., 2014). Graduates cannot be proficient in recent technologies because the industry updates at a faster rate than curriculum (Hollister et al., 2017).

Industry demands can be met by job shadowing, internships, industry assistance in curriculum development and collaboration on projects (O' Sullivan, 2016). Alshare and Sewailem (2018) agree and suggest that employers participate in designing the curriculum and that graduates are offered on-the-job training. The curriculum should be revised periodically to align with what industry requires so that industry's expectations are closely involved in the evolution of the curricula (Sinha, Gosh & Mishra, 2020). Chillas et al. (2015) emphasise the fact that students are expected to be productive workers when they are employed for an internship, rather than learning how to do the job at hand. The graduates often do not know what the best practices are in their work environment (Chan Mow et al., 2015). More recently, there is a need for companies to be prepared when the graduate enters the workplace since graduates have not been exposed to working (Briedis et al., 2019).

Having discussed the disparity between university and industry, the gap in skills, the re-evaluation and outcomes of internship programs, Fulgence (2015) is of the opinion that the recruitment process is core when recruiting quality graduates as this is essential to the performance and survival of an organisation. Tubaishat (2015) introduces an e-portfolio to help graduates increase their chances of employment by ensuring that their work is showcased online. They argue that this may improve the student's confidence when applying for the job and make the interview more meaningful, since discussions could be centred around the portfolio.

There seems to be an increase in the utilisation of assessment tests, rather than only looking at academic results during the recruitment process (Fulgence, 2015). The fact that students perform well in exams is not necessarily an adequate indicator for job readiness (Alshare &

Sewailem, 2018). Communication skills, attitude, curriculum vitae presentation and behavioural qualities are seen as important when successfully recruiting graduates and the need to measure personal qualities using aptitude tests also increased (Fulgence, 2015).

2.3 Definitions

2.3.1 Screening tests

Screening tests are “part of the recruitment process required when employing potential employees” (Fulgence, 2015:198).

2.3.2 Learning

Learning is “the process whereby knowledge (the result of the combination of grasping and transforming experience) is created through the transformation of experience” (Rajadurai et al., 2018:138).

2.3.3 Technical competencies

Technical competencies are defined “as the ability to choose and apply an integrated combination of knowledge with the intention to realise a certain task in a certain context” (Akman & Turhan, 2018:201).

2.3.4 Generic skills

Generic skills (also known as transferable skills) include “communication, problem-solving, personal qualities, metacognition and team skills which relate to the management of self, others, information or tasks” (Clark, 2018:1925).

2.3.5 Problem solving

“The ability to process information, think systematically and make correct decisions in both routine and unusual problems in a workplace that requires critical thinking skills to assess the problem” (Siddoo et al., 2019:e01723).

2.3.6 Graduate employability

Employability refers to “the ability of an individual to gain employment appropriate to his/her educational standard” (Wickramasinghe & Perera, 2010:226).

Employability is defined as “a set of achievements – skills, understanding and personal attributes – that make graduates more likely to gain development and be successful in their chosen occupation, which benefits themselves, the workforce, the community and the economy” (Butum & Nicolescu, 2019:74).

2.3.7 Quality graduate

A quality graduate is “when the competencies set out by higher institutions meets the requirements of the workplace” (Kruhlyk, 2017:71).

2.3.8 Personal skills

Personal skills include “attributes such as being responsible, resourceful and self-confident” (Alshare & Sewailem, 2018:2).

2.3.9 Adaptive skills

Adaptive skills “help you function in a new situation, for example flexibility. They are enthusiasm, honesty and getting along well with people” (Omoniwa & Adedapo, 2017:63).

2.3.10 Transferable skills

Transferable skills include “personal abilities, characteristics or skills that transfer or can be used from one job or situation to another” (Omoniwa & Adedapo, 2017:63).

2.3.11 Soft skills

Soft skills are described “as character traits that enhance a person’s interactions, job performance, and career prospects the greatest feature of soft skills is that they are intangible and are not discipline specific, that is the application of these skills is not limited to one’s profession” (Omoniwa & Adedapo, 2017:63).

Soft skills are defined as “non-job specific skills that are related to individual ability to operate effectively in the workplace” and also “skills that are cross-cutting across jobs and sectors and relate to personal competences (confidence, discipline, self-management) and social competences (teamwork, communication, emotional intelligence)” (Gabor et al., 2019:4).

2.3.12 Characteristics

Characteristics are categorised as “business fundamentals, analytical and critical thinking, interpersonal, communication and team skills, and technology” (Plice & Reinig, 2007:24).

The characteristics of an individual refer to “intellectual, managerial, social and emotional skills” (Khampirat et al., 2019:131).

2.3.13 Recruitment

Recruitment is defined as “the firm-specific capabilities to identify and access individual expert competencies developed in external firms and institutions, and the processes of selecting and integrating these into the cognitive domains of the firm” (Joranli, 2018:184).

2.3.14 Work readiness

Work readiness can be defined as “the extent to which graduates are perceived to possess the attitudes and attributes that make them prepared or ready for success in the work environment” (Magagula et al., 2020:4).

2.4 Employing graduates in the IT industry

2.4.1 Graduates in the computer science industry

Experts in the industry believe that graduates who are to be workplace ready should focus on programming, software engineering processes and soft skills like problem-solving, critical thinking and teamwork in computer science degrees (Sultana & Reed, 2018). Cvetkovic, Gligorijević, Petković, Jović, Milovančević and Nikolić (2019) mention that collaboration between industry and university is essential to the successful entry of graduates into the workplace because graduates lack knowledge not thoroughly covered at university. Work experience together with a qualification is beneficial for successful entry into the workplace and for career development (Ebner, Soucek & Selenko, 2021). It is important for educators and curriculum designers to incorporate soft skills into tasks and group projects by using teamwork which will increase thinking and enhance graduates’ soft skills (Tseng et al., 2019). Chhinzer and Russo (2018) posit that curriculum development should focus its efforts on aspects that affect employers’ perception of graduates’ employability. Lundberg et al. (2021) says that it is imperative for graduates to receive education that is sought after in the workplace.

Grooming graduates is important as they contribute to the economy. Exposing graduates to new skills during work-integrated learning (WIL) allow graduates to apply the skills they learnt during theoretical learning and to everyday situations in the workplace (Tamin et al., 2019). Students are given projects that require teamwork but are not trained on processes and conflict management that are used during teamwork (Chhinzer & Russo, 2018). Students should also be exposed to companies in their chosen field by participating in WIL, internships or other forms of practical exposure (Hora, 2020). An indicator of how effective training has been can only be assessed once the graduate is employed (Kruhlyk, 2017). According Byrne (2022), universities should introduce extra-mural activities, internships and the possibility to study abroad so as to improve employability.

Rajadurai et al. (2018) mention that ensuring the curriculum and practical training are relevant, effectively allow the students skillsets to align more with industry and create a smoother transition from higher education to the workplace. Lin (2019) states that time constraints during the course duration, limit educators having them focus more on theory than on growing the problem-solving ability and critical thinking skills of the student. The amount of knowledge the

graduate needs, will always be increasing and by the time they are done with their studies, their learnings could be obsolete because of the fast-moving pace of the industry (Kruhlyk, 2017). Certification prior to graduation could bridge the misalignment gap between curricula and industry needs and the quality of the graduates degree is questioned (Tan & Paul, 2018).

The misalignment between industry and the curriculum could however be a quality issue as more emphasis is placed on the theory, technical computer science topics and maths, instead of project management, communication skills and professionalism (Garousi et al., 2019). Baird and Parayitam (2019) opine that the alignment between universities and industry can only be accomplished if the two parties work together to understand the needs and competencies required by the industry. Higher Education institutions should shuffle the curriculum and practical training so that graduates are industry ready and able to indirectly contribute to the economy since they will be equipped with the skills needed to start in the workplace (Rajadurai et al., 2018). Core competencies and critical skills such as thinking analytically, technological ability, strategic thinking, problem-solving, communication and collaboration (Baird & Parayitam, 2019) are important.

The main issues faced by employers when filling positions include a lack of the required skills, job attractiveness, perceived job satisfaction and inefficient recruiting (Bilan, Mishchuk, Roshchyk & Joshi, 2020). Successful recruitment has to be done by an IT employer and not HR (Hollister et al., 2017). When graduates are successfully employed, Jaradat (2017) suggests that employers can use their existing staff to monitor the interns and coach them on various skills that are needed and that are lacking. Garousi et al. (2019) state that hiring managers could address the lack in knowledge, adjust the interview process when hiring graduates and identify the missing competencies within the workplace and hire accordingly.

2.4.2 Employing computer science graduates

Employability is defined as “a set of achievements—skills, understanding and personal attributes—that make graduates more likely to gain development and be successful in their chosen occupation, which benefits themselves, the workforce, the community and the economy” (Butum & Nicolescu, 2019). Software engineering graduates face difficulties in their first jobs because of the misalignment of curriculum versus the needs of the industry (Garousi et al., 2019). Shortage of skills is a growing problem that is aggravated by the inadequate placement of graduates in the workplace where gaps between curriculum and industry can be assessed (Tamin et al., 2019).

Baird and Parayitam (2019) posit that employers look for interpersonal skills and problem-solving ability before their final decision to employ a graduate. This means that universities need to pay close attention to enhancing these skills by including teamwork in the curriculum

(Baird & Parayitam, 2019). Students need to develop various skills such as social, cultural and other soft skills that can be honed in a classroom environment making it easy for the students to recognise and be able to apply these skills in the workplace (Briedis et al., 2019).

A challenge is a shortage of highly skilled professionals in the industry (Balina, Rozita & Steinbuka, 2017). This lack of highly skilled professionals could impede further development of the technology industry (Balina et al., 2017). There is a high demand for IT graduates, but companies are reluctant to hire graduates who do not possess the required skills making collaboration between universities and industry vital to the success of graduates in the workplace (Lundberg et al., 2021). Brilingaite, Bukauskas and Juskeviciene (2018) suggest using a problem-based learning module to guide the curricula design of ICT for generic competencies. The problem based learning can also foster skills essential for the future ICT sector that will give the student early exposure to the way work is done in industry. Furthermore, real life projects will show students what is really needed in the industry.

Employability skills should be taught to enhance the graduate's productivity in the workplace (Omoniwa & Adedapo, 2017). Companies should have supplementary training when graduates are employed that focus on knowledge areas not sufficiently covered in universities (Tuzun et al., 2018). Omoniwa and Adedapo (2017) are of the opinion that although graduates possessed some skills satisfactory for employment, in some cases not enough to meet the requirements of the specific job. There is consensus on which skills are needed and important for graduates to be employable. These are soft skills such as communication, teamwork and PM and then problem-solving skills, and critical thinking (Garousi et al., 2020; Baird & Parayitam, 2019; Tan & Paul, 2018; Balina et al., 2017).

2.4.3 Critical factors that affect the employability of graduates

Suleman and Costa Laranjeiro (2018) indicate that literature overlooks employers' opinions of the skills that graduates bring to the workplace. The majority of employers are dissatisfied with the graduates' soft skills and other personal traits deemed important by the industry. Employees mention that graduates do not possess the standard employability skills that are required when they enter the workplace (Sarkar et al., 2020). A survey done revealed that IT leaders felt that soft skills, technical skills and skills related to certification and work experience were important (AlGhamdi, 2019). When graduates enter the workplace, they are required to understand how the company works and mould into the company culture however, workplace knowledge and culture cannot be taught at university (Lundberg et al., 2021).

Attributes important for graduate employability are communication, teamwork, problem-solving, creativity, critical thinking, time management and research skills integrity (Osmani, Weerakkody & Hindi, 2017). Critical thinking and problem-solving is essential to an ever-

changing environment (Baird & Parayitam, 2019). Graduates need to possess skills such as teamwork, problem-solving and communication but the wrong attitude could be detrimental to their level of employability (Jayasingam, Fujiwara & Thurasamy, 2018). Employees mention that graduates' attitude towards the company and the teams they work with together with the graduates' ability to be sincere and resilient are seen as strengths (Chhinzer & Russo, 2018). There is still a need for soft skills to be taken more seriously in industry and in coursework (Alshare & Sewailem, 2018; Suleman & Costa Laranjeiro, 2018; Hollister et al., 2017).

The employability of graduates is an important issue for educational institutions because graduates are faced with an ever-changing workplace. This means that graduates are required to possess the skills that the workplace requires (Sarkar et al., 2020). The education system's goal is to equip graduates with specific industry skills and competencies that they do not often possess when entering the workplace (Akman & Turhan, 2018). Universities currently focus on teaching humanities, engineering and science to students, but they have not fully focused the students on core skills such as critical thinking, leadership skills, entrepreneurship and innovation (Hong et al., 2022). Higher education is the key to helping students improve their employability by ensuring that they are equipped with the knowledge, skills and attitudes required by industry (Beyrouti, 2017). Tseng et al. (2019) agree and state that more attention should be placed on simulating business and real-world situations that allow students to be exposed to real-life problem-solving. Scholtz (2020) concurs and mentions that workplace-based learning is important in qualifications since it provides students with insights into the professional world. It is unrealistic to be of the opinion that graduates can be prepared for specific skills and specific characteristics suited to a particular workplace environment since each environment has its own structure, knowledge areas, culture and political structure (Moore & Morton, 2017).

Even though IT projects are a team effort that involves collaboration, individual performance is also important to the success of the project (Akman & Turhan, 2018). Project managers want different competencies when graduates need to work independently as opposed to working in a team (Akman & Turhan, 2018). Behaviours and attitudes of graduates vary depending on their technical, personal skills and educational background (Akman & Turhan, 2018). Developing transferable skills such as critical thinking, communication and teamwork is important in ensuring employability as is ensuring curricula taught at higher education institutions are of a high quality (Beyrouti, 2017). Chhinzer and Russo (2018) say that professional maturity such as taking the initiative is essential to the graduates' employability and is a positive addition for the employer regardless of graduates' level of education. Differences between employers' expectations and skills possessed by the graduate in terms

of individual and teamwork is evident in time management, project experience and the ability to adapt to new software development approaches (Akman & Turhan, 2018).

Graduates mention that in the industry they utilise skills that are not covered in their degree curricula (Exter, Caskurlu & Fernandez, 2018). There is a perception that skills learnt at university and those required in the workplace are the same, making it imperative that curriculum designers understand what graduates perceive work-readiness to be (Magagula et al., 2020). Graduates further mention that problem-solving, lifelong learning, critical thinking, communication, teamwork skills, logic, and interdisciplinary are important skills to possess. They emphasise more attention should be given to these skills even if it means de-emphasising other skills that may be dated (Exter et al., 2018).

2.5 Quality of IT graduates

2.5.1 Quality of IT graduates in the workplace

Software engineering graduates face difficulties in their first jobs because of the misalignment of curriculum vs needs of industry and the belief is that it is not the skills shortage but a quality of skills shortage (Garousi et al., 2020). According to Smith, Ferns and Russell (2019), assuring the quality of learning in the workplace is challenging since students' outcomes vary based on interactions with other employees and various factors within the industry. Arriving at a single definition of quality is a waste of time according to Nabaho, Aguti and Oonyu (2017). Higher education should focus on developing critical thinking skills rather than being a technician.

Assuring quality is challenging, since graduate's outcomes vary based on variable reliance's within the industry (Smith et al., 2019). The industry is very competitive and therefore employer feedback on the quality of the graduate is very important. Employers also view the graduates' ability to continuously learn as a strength and believe that graduates who have done some work as being employees who contribute to the company and as being a student who is constantly learning (Chhinzer & Russo, 2018).

The criteria being used to evaluate whether graduates are suited for the workplace have drastically changed (Viccica & Goodell, 2017). This is echoed by Omoniwa and Adedapo (2017) who mention that some skills required by graduates were not at the level required by industry and that the quality of graduate training should be geared at equipping graduates with practical or industry skills. Tan and Paul (2018) state that the quality of the degrees' students is obtaining is questioned and that research should periodically be conducted to keep up with the times and ensure that what is being taught is relevant to what is needed. Universities need to confidently ensure that their graduates are prepared with the important skills and competencies required in the workplace which can be achieved by introducing career

preparation into the curriculum so as to prepare students with the tools required by industry (Baird & Parayitam, 2019).

2.5.2 Determining the quality of graduates' skills

Employers are left less satisfied with the performance of the graduates which could be accredited to the skills that the graduate possesses not being relevant to the business. Alshare and Sewailem (2018:18) mention that this could be explained in three ways: i) important skills are not taught at institutions, ii) skills possessed by the graduates are not important or relevant to the business and iii) main objective of business and institutions differ e.g., business to excel versus future business leaders. Business value soft skills are needed to grow and improve their business (Alshare & Sewailem, 2018). Graham, Williams and Chisoro (2019) state that certain groups of graduates still struggle to find employment due to lack of work experience, inefficient job searching and cost associated with job seeking.

The most pressing issue is the gap between what is needed versus what is attained at university. Graduates should pay more attention to what is required in the workplace than what they are interested in doing (Baird & Parayitam, 2019). Graduates who are exposed to real-world problems during their studies are more likely to develop the problem-solving, critical thinking and curiosity required for the workplace and can be enhanced by introducing WIL into the graduates' curriculum (Sarkar et al., 2020). Sarkar et al. (2020) mention that this approach can only be fruitful if there is proactive collaboration between industry and education institutions. The quality of the training is directly linked to industry needs and part of the WIL program covers technical and soft skills (Tamin et al., 2019). Industry and universities are required to collaborate to ensure that the correct training is offered in the workplace so as to close the gap between education and workplace expectations (Lundberg et al., 2021).

The need to measure graduate capabilities is challenging after they have completed their degree (Sandri et al., 2018). Institutions provide students with the necessary capabilities for their careers. It is important to measure the graduate uptake and application of the capabilities in order to create sustainable curricula to educate future students (Sandri et al., 2018). The employability of graduates is complex and involves various aspects that can only be achieved if they have industry and academia support. A pre-requisite of work readiness should be a well-defined practical training that allows for the integration between curriculum and practical work experience (Graham et al., 2019).

Employability is a collection of skills, attributes and characteristics that employers expect from workers. Skills that are important are professional maturity, soft skills, problem-solving, continuous learning, communication, time management, teamwork and attention to detail among others (Chhinzer & Russo, 2018). Graduates can grow their own degree of

employability by awareness of what skills are required (Sarkar et al., 2020). They need to be actively involved in continuous learning in those aspects that will be beneficial in the workplace. Students are required to learn holistically to strengthen their ability in the workplace by participating in multi-faceted learning that will make them work-ready (Hong et al., 2022). The graduates' initiative is seen as the ability to go beyond what is expected. However, the graduates' willingness to work demonstrates the graduates' willingness to meet their basic work requirements which is fundamental to the graduates' employability (Chhinzer & Russo, 2018).

2.5.3 Training of IT graduates

Employers find it challenging to fill job vacancies because of lack of experience and workplace competencies (Anicic, Divjak & Arbana, 2017). An indicator of how effective the training at universities is comes into play once graduates are employed. The amount of knowledge that the graduate will need to know will always be increasing which means that training of these graduates should be of quality to avoid their knowledge from being obsolete (Kruhlyk, 2017).

The marketability of graduates depends on whether they possess certain skills needed by industry. The curriculum should enable flexibility so as to forecast the skills needed in industry in order for students to be exposed to current challenges as part of their studies and practical training (Rajadurai et al., 2018). Cvetkovic et al. (2019) mention that there are multiple ways to ensure collaboration between universities and industry. However, it can only be successful if the implementation to bridge the gap is taken seriously by the students who are attending these classes.

According to Suleman and Costa Laranjeiro (2018), there is also a lack in technical skills when graduates enter the workplace that ultimately results in the company training the graduates. It is of utmost importance to ensure continuous training for all staff within an organisation (Naros & Simionescu, 2019). Improved measures should be put in place to ensure that companies are developing their employees to stay up to date in the changing environment. The learning does not stop at institution level but needs to further develop by allowing collaboration and familiarising of the graduate with the company's practices (Lundberg et al., 2021). It is a given that the experienced professionals in the workplace contributes towards the graduates' success both professionally and personally and universities are required to invest more resources into employability strategies (Healy et al., 2021).

Briedis et al. (2019) mention that exposing graduates to various departments within the company allows the graduate to learn about the overall company structure and stakeholders on the project. Baird and Parayitam (2019) mention that working together in teams can enhance problem-solving and critical-thinking skills to emulate the workplace environment.

Employers are encouraged to support employees by offering support in learning as technologies are constantly evolving in industry and finding raw talent and grooming them by using on-the-job training will ensure that graduates stay since their skills are being developed (Sacolick & Mateo, 2022). Briedis et al. (2019) argue that companies should start the graduate with smaller tasks that will give the graduate a sense of achievement once completed which provides the graduate with great reward as they tackle the next task towards a more complex task. Employers are as responsible for the growth and development of graduates as universities because growth can only be achieved if industry and universities partner together (Baird & Parayitam, 2019).

Universities should also make the student aware of the cultural aspect in interviews and the possible discrimination that the student can be exposed to. Students' competencies should be strengthened while navigating them through the cultural aspects of the interview process (Hora, 2020). Institutions provide students with the necessary capabilities for their careers but measuring the graduates' uptake and application of said sustainability capabilities is important in creating sustainable curricula to educate future students (Sandri et al., 2018). There is a gap between the development and assessment of the graduates' employability skills. This may be because of the limited resources available to assess the graduates ability to think critically, problem solve and the graduates ability of written communication (Sarkar et al., 2020). Tuzun et al. (2018), however, suggest that companies have supplementary training when graduates are employed with the focus on knowledge areas not sufficiently covered in universities. Scott, Connell, Thomson and Willison (2019) undertook a pilot study that introduced additional training to improve the performance and skills namely teamwork, problem-solving, adaptability and resilience of students and make them work-ready. This additional training has been beneficial and also improved the graduate's confidence levels when faced with using these skills (Scott et al., 2019).

2.6 Required skills as defined by industry

Various skills have been identified as important when graduates enter the workplace. These skills are listed in Table 2.1 below.

Table 2.1: Skills required by industry when graduates enter the workplace

Reference	Real world problems	Time management	Creativity	Leadership	Critical thinking	Teamwork	Critical skills	Culture fit	Technical skills	Problem solving	Interpersonal skills	Personal achievement	Professionalism	Communication / listening
AlGhamdi, (2019)									x		x			
Sarkar, et al., (2020)					x					x				x
Tseng, et al., (2019)	x					x								
Hong, et al., (2022)				x	x									
Lin, (2019)							x			x				
Hora, (2019)								x						
Baird & Parayitam, (2019)							x					x	x	x
Garousi et al., (2020)													x	x
Tan & Paul, (2018)			x		x	x				x				x
Sultana & Reed, (2018)					x	x				x				
Garousi et al., (2019)	x													
Harun et al., (2017)			x		x	x				x			x	x
Viccica & Goodell, (2017)			x		x					x				
Osmani, Weerakkody & Hindi (2017)		x	x		x	x				x				x
Exter, Caskurlu & Fernandez, (2018)					x	x				x				x
Chhinzer, Russo, (2018)		x				x							x	x

2.7 Strategies for employing graduates

According to Baird and Parayitam (2019), job dissatisfaction occurs when graduates are not prepared for the workplace or end up in a job that they are disinterested in. Interpersonal skills are rated high by employers because of remote teams across the world with cultural differences and the graduates' motivation to achieve is also important for growth within the company (Baird & Parayitam, 2019).

Companies are required to successfully on-board a graduate into a job and to remunerate them accordingly (Hong et al., 2022). Companies are also required to be ready to receive the graduate which means that the company must know what the graduate is to work on during the first 5 days of employment (Briedis et al., 2019). They add that most graduates have not been exposed to working in industry. Graduates may not be familiarly with various tools or processes used by the company therefore companies should provide tutorials or other help to on-board the graduates. The development of students' employability will be more effective and cover a wider range of skills if professionals in the workplace are intentional about their role in cultivating fertile learning environments as the students' journey through university into the workplace (Healy et al., 2021). Briedis et al. (2019) mention that graduates learn most effectively by doing and require coaching when communicating with customers as communicating would be new to the graduate.

Using external experts allows the students to build relationships with these professionals who offer the students a different perspective and suggest different career opportunities for their chosen course of study thereby widening their career choices (Scott et al., 2019). Allowing graduates to shadow with other team members and give input will improve their problem-solving skills so that they are able to take on harder tasks as they complete the simpler tasks (Briedis et al., 2019).

Magagula et al. (2020) said that work-readiness will be enhanced if students are exposed to real-world scenarios and linked to industry while studying. Clark (2018) mentions that universities have developed generic skill-based learning outcomes that have been added to qualifications that are expected to increase graduate employability. Higher education is market-driven as opposed to defining graduate employability. Bender 2021 said that measuring the graduates' capabilities against what is required is challenging. All stakeholders need to rethink the shaping of graduate employability and to manage this so that the graduates experience can have a favourable outcome (Clark, 2018). Chou, Tseng, Wang, Chao, Chen, Lai, Chan and Yu (2018) mention a way to regulate curriculum is to have a curriculum committee who identifies what graduates core competencies are, designs the curriculum around these competencies, evaluates and reflects on the graduates' progress. This

committee then alters the curriculum accordingly so that by using data received through evaluation, can reflect on competency-based learning to help student in assignments and tests which will give valuable information for curriculum development (Chou et al., 2018). A strategy to make graduates more work ready has been developed that focuses on employability skills in the final year of study. These skills are formulated into a module that ensures the involvement of external experts. This module is highly beneficial and also improves the graduates' confidence levels when faced with using these skills (Scott et al., 2019). Hong et al. (2022) posit that students participate in internships and undergo further training within their university to make them work-ready and enhance their required abilities. Ensuring that the curriculum and practical training is relevant and effective allow the students skillsets to align more with industry and creates a smoother transition from higher education to the workplace (Rajadurai et al., 2018). Graham et al. (2019) indicate that the pre-requisite of work readiness should be a well-defined practical training that allows for the integration between curriculum and practical work experience.

Verma, Nankervis, Priyono, Saleh, Connell, et al. (2018) opine that HR managers (HRMs) can however successfully bridge the gap between the workplace and the graduates by decreasing the mismatch between demand and supply by ensuring that the graduates understand what the needs of the employers are. HRMs should adopt a proactive approach before a graduate starts working for example: continuous feedback, training and correct placement, knowledge transfer, active involvement and mentoring. A structured induction programme would be useful to ensure that graduates are confident, are familiar with the workplace and have been introduced to other team members (Roepen, 2017).

Khampirat et al. (2019) mention that WIL allows students to develop generic and work skills and assist graduates in choosing academic and career directions. However, students are responsible for ensuring that their behaviour and approach to learning is lifelong so that they can apply their knowledge and skills effectively in the workplace (Khampirat et al., 2019).

2.8 Testing of graduates for employment

Skills (talent) are important as industry is more conscientious in their assessment of skills, but little is known about whether graduates meet this assessment of skills set in the workplace (Harun et al., 2017). Experts also recommend that assessments need to be done using a learn by doing approach technique so that students can increase their knowledge and learn best practices (Sultana & Reed, 2018).

Baird and Parayitam (2019) posit that universities can also prepare the graduates for the screening process, written communication skills, interpersonal and presentation skills as part of their academic curriculum. Industry should network with students by teaching them how to

apply for a job and the various types of documentation required which can be done via workshops so as to build the graduates interpersonal skills (Baird & Parayitam, 2019).

Hora (2020) opines that employment is often subjective as is the case when employing someone who is a culture fit into the company. Hora (2020) further says that culture fit encompasses measuring personality, attitude and various cognitive competencies against existing staff members and industry standards. Employers are more and more hiring for culture fit within the organisation than on the basis of what the graduate has studied or their technical ability (Hora, 2020). Rose et al. (2021) agree and add that there is an increase in determining culture fit when graduates enter the workplace as both employers and employees seek to be a mutual fit for one another. When companies are selecting candidates for employment, they will select those who are the best fit for the organisation. Alternatively, if an employee does not feel they are a fit for the organisation, they will leave (Rose et al., 2021). Undurrage (2019) adds that an important factor for recruiters is to ensure that the personal characteristics of the candidate matches what the organisation is looking for in terms of culture fit, organisation values and other expectations by both the organisation and the candidate.

When interviewing possible graduates, remuneration and identifying what work the graduate will do are the key to employment (Briedis et al., 2019). Employers' perception of employability includes the graduates' ability to work in a team and is assessed when graduates apply for a role. Another criterion for employability is the graduates' knowledge pertaining to the job the graduate has applied for (Chhinzer & Russo, 2018).

It is important to research the assessing of graduates to understand how graduates apply the knowledge they learnt while studying (Sandri et al., 2018). Garousi et al. (2019) agree and mention that the hiring managers could address the lack in knowledge, adjust the interview process when hiring graduates and identify the missing competencies within the workplace and hire accordingly. There is a gap between the development and assessment of the graduates employability skills since there seems to be limited resources available to assess the graduates' ability to think critically, problem solve and the graduates' ability of written communication (Sarkar et al., 2020). Bilan et al. (2020) posit that the main issues faced by employers when filling positions include a lack of the required skills, job attractiveness, perceived job satisfaction and inefficient recruiting. Employers hire candidates they can relate to, candidates they feel are honest and prefer hiring candidates based on what they perceive to know rather than what they do not know (Undurrage, 2019). Successful candidates are contacted to inform them that their application was successful. However, candidates who have not been shortlisted or do not receive and job offer often receive no feedback from employers

resulting in the candidate not knowing the reason why they were not employed (Undurrage, 2019).

The development of the tests is many times home grown and are seen as so called logical testing instruments. These instruments are in many cases created by non IT people or by IT people who have their own definitions of what logic and logical testing are. This exposed the student (applicant) to a rather impossible situation, and as a result, the student almost always fails. Candidate testing is widely used but the evidence of its validity in predicting whether a candidate is suitable is debatable (Undurrage, 2019).

2.9 Theories

A theory can be defined as evidence that “if we have expectation that by doing A, B with happen, then by manipulation the occurrence of A we can begin to predict and influence the occurrence of B. In other words, theory is clearly enmeshed in practice since explanation enables prediction which in turn enables control” (Saunders et al., 2009). The theories development from the research was selected based on the nature of the study, to explore the testing of graduates before they enter the workplace and understand the curriculum development at universities. Many theories to the employment of graduates have been noted but few have been relevant to the curriculum development, testing and employability of graduates and then the training and development of graduates. The research was built on the following theories: i) gap identification theory (Pratt, Keys & Wirkus 2014; Pertegal-Felices et al., 2014; Wickramasinghe & Perera, 2010), ii) screening theory (Harun et al., 2017; Fulgence 2015; Cohen & Pfeffer, 1986), iii) training and development theory (Moore & Morton 2017; Chillas et al., 2015; Archer, 1983).

2.9.1 Gap identification theory

Employability is measured based on knowledge, required skills and the attitude of the person applying for the job. Literature shows a gap between skills that graduates are taught at university and skills the graduates possess when they enter the workplace (Wickramasinghe & Perera, 2010). Pratt et al. (2014) opine that educators have the responsibility of educating students for the workplace. However, this can only be done by collaboration with employers so that educators can successfully bridge the gap in the workplace. Pertegal-Felices et al. (2014) mention that graduates entering the workplace required higher levels of personal, social and emotional skills than they possessed.

This is consistent with the results obtained for professional competencies that show that employers demanded more skills than those acquired by graduates. Students are not sufficiently skilled in these core competencies which industry expected them to have and these were not part of their curricula. Bender (2021), however, mentioned that feedback in the form

of the students' experience in the workplace needs exposure to ensure employers' accountability. The same is evident in newer literature where graduates do not acquire adequate skills as needed by the industry which is indicative of the necessity of collaboration between industry and the workplace (Sarkar et al., 2020; Cvetkovic et al., 2019; Alshare & Sewailem, 2018; Hollister et al., 2017; O' Sullivan, 2016).

2.9.2 Screening theory

Cohen and Pfeffer (1986) state that there has been research done on the use of interviews, personal information and testing but testing requires more research and that most testing has been in terms of technical skills. Fulgence (2015) mentions that the recruitment process is core when recruiting quality graduates as this is key to the performance and survival of an organisation. There is an increase in determining culture fit when graduates enter the workplace as both employers and employees seek to be a mutual fit for one another (Rose et al., 2021).

Graduates are an important part of the labour force. Rapid changes in the world economy and new trends in the workplace have made companies more selective in choosing the right person for the job. For industry graduates need to possess achievement skills, be knowledgeable and have good personal attributes (Harun et al., 2017). There seems to be an increase in using assessment tests than only looking at academic results during the recruitment process (Fulgence, 2015).

Screening theory can be divided into: i) learning theory, ii) elaboration likelihood theory, and iii) dissonance theory (Charles & Florah, 2021:454). Learning theory looks at assessing behaviour using a screening panel, their ability to continuously learn and assessing their attitudes. Elaboration likelihood theory tests whether the graduate can be employed without prior experience, but with training, can enhance what the graduate needs to know to be able to do the job they have been employed for (Charles & Florah, 2021:454).

Research shows that companies employ persons who are loyal, reliable and have good attitudes and values (Cohen & Pfeffer, 1986). Dissonance theory observes a graduates' attitude during conflict and explores how to reduce friction that stems from different views (Charles & Florah, 2021:455). The screening process does not ignore the value of formal education but does screen the graduates' ability to apply their theoretical and abstract knowledge (Joranli, 2018). There has been a great amount of research done on the use of interviews, personal information and testing but this testing, however, requires more research (Cohen & Pfeffer, 1986).

2.9.3 Training and development theory

Archer (1983:82) mentions that the graduate curriculum is two-fold: i) it prepares the graduate for their studies but ii) also for the workplace. Ensuring that graduates are ready for the workplace requires an answer to the question on what industry expects from our graduates (Archer, 1983). Students who can demonstrate soft skills are more likely to gain internships, will receive more training and later be permanently employed (Chillas et al., 2015).

According to Moore and Morton (2017), it is unrealistic to be of the opinion that graduates can be prepared for specific skills and specific characteristics suited to a particular workplace environment. This is because each environment has its own structure, knowledge areas, culture and political structure and that graduates are only job-ready once they are in a particular job in a particular workplace. Starting a career is daunting for a graduate but so is the expectations that employers place on the graduates who enter the workplace (Ebner et al., 2021).

Hong et al. (2022) mention that companies are required to successfully on-board a graduate into a job and to remunerate them accordingly. Finding raw talent and grooming them by using on-the-job training will ensure that graduates will stay since their skills are being developed (Bilan et al., 2020).

2.10 Conceptual framework

A conceptual framework can be defined as “an argument about why the topic one wishes to study matters, and why the means proposed to study it are appropriate and rigorous” (Burkholder, Cox, Crawford & Hitchcock, 2019). Theoretical and conceptual frameworks often are unclear when used within the qualitative method and either result in the benefit or not of these differences. A conceptual framework could be seen as a map that routes out the pathways of the literature in relation to the study in question (Collins & Stockton, 2018). Burkholder et al. (2019) agreed and mentioned that the conceptual framework assists the researcher and the examiner in understanding how the study contributes to the body of knowledge.

The conceptual framework in Figure 2.2 aims to show the relationship the students, training, university, curriculum development, industry and employment has in relation to what an ideal candidate for employment is. It connects the theories (i) gap identification theory ii) screening theory and iii) training and development theory) with the RSQs and identifies the variables used in this study. The conceptual framework illustrates how industry, students and universities contribute to and is interlinked to identifying an ideal candidate. The framework also illustrates how the ideal graduate is affected by curriculum development, employment and then training.

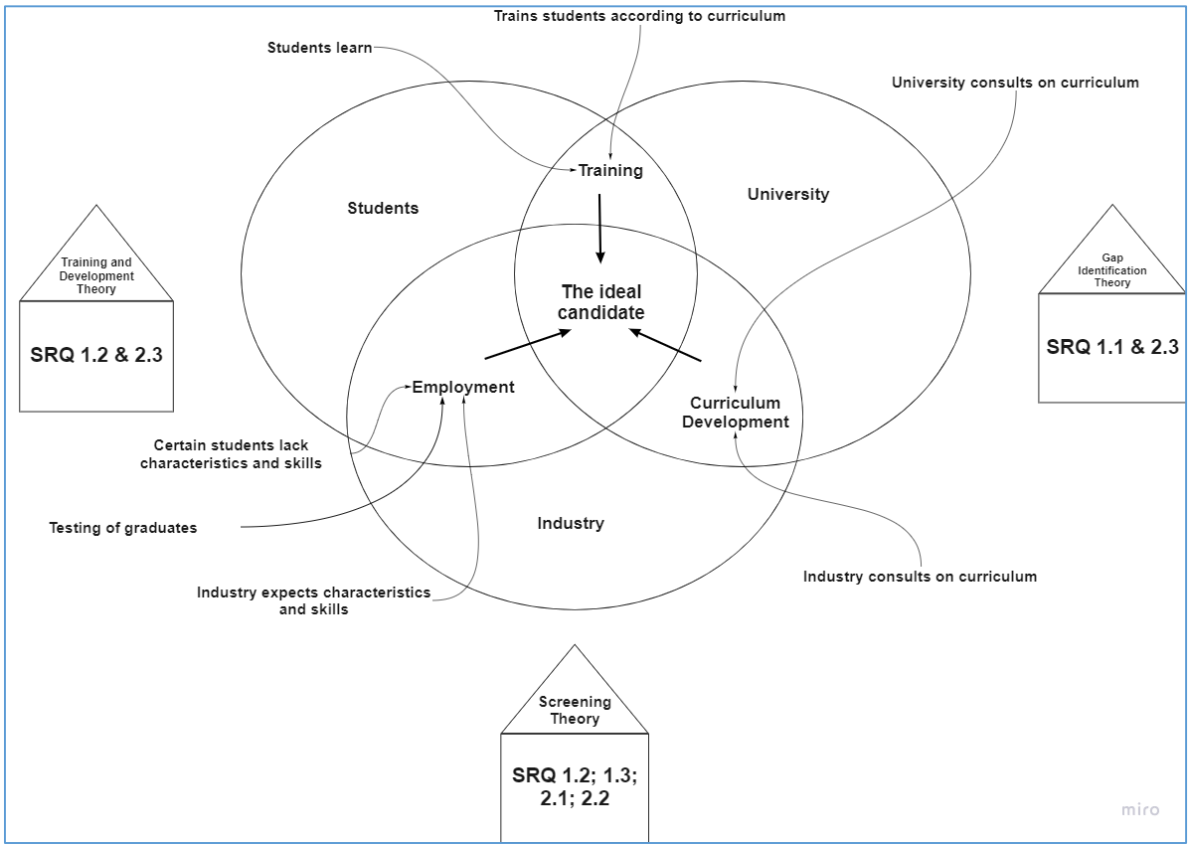


Figure 2.2: Conceptual framework

2.11 Summary

There is been much talk and research about the discrepancies between industry and what is being taught at universities. The same outcome is illustrated which is that soft skills like communication, teamwork, critical thinking and time management is generally lacking when graduates enter the workplace. Various studies have tried to minimise this by introducing extra curricula, internships, work integrated learning and increasing the communication between industry and universities in the hope of bridging the gap that has left graduates less desirable and industry frustrated.

Training has also been a topic whereby various authors have differing ideas but have one common thought is to ensure that the graduate is trained to do the job and that companies take an active role in the training of graduates so as to develop their skills for personal but also organisational growth. Universities however have to ensure that they spend the time assessing the quality of these training programs to ensure that they are fostering quality graduates that have had some training to compliment the theoretical training acquired during their studies.

Graduates are then, after university studies and practical training, employed at companies but then fail to meet the needs of these companies. Tests are put in place to ensure that these graduates meet the requirements for the job but whether these tests are relevant for the job or

the skill level of the graduate is at question. No formal or informal training or preparation is given to the graduate to equip them for the testing and minimal research has been done to determine how these tests are produced and whether the correct persons are carrying out the testing and then ultimately employing the graduate. The employment of the graduate cannot be the sole decision made by HR and should be a combination of HR and other IT staff that have first-hand experience of the job and its required skills.

There are varying strategies for employing graduates, but authors feel that these strategies should be put in place at the universities or workplace training. WIL and practical training will improve the graduates' confidence in the workplace since they would be exposed to the challenges associated with working and will be able to contribute to possible solutions. HRM can also successfully bridge the gap between workplace expectation and the graduates' skills.

In the next chapter, the research design and methodology used to conduct this research will be discussed.

CHAPTER 3: RESEARCH METHODOLOGY AND DESIGN

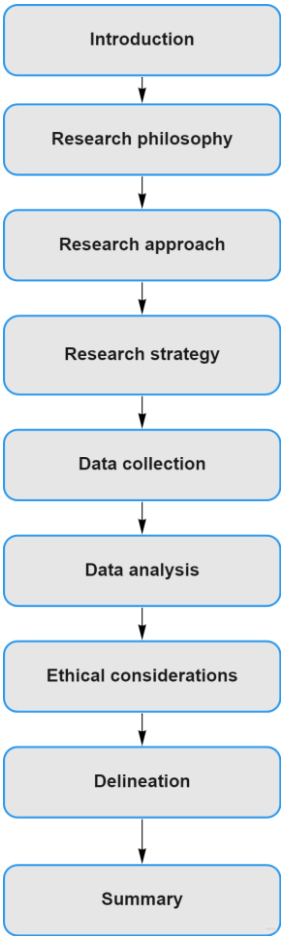


Figure 3.1: Layout of Chapter 3

3.1 Introduction

Research methodology is the “theory and analysis of undertaking a research” and allows for the collection and extracting of research data to add to the body of knowledge (Bilau et al., 2018:2). Research design “focuses on the end-product” and the “logic of the research” using the research problem to drive the research design (Babbie & Mouton, 2015:75). In its simplest explanation, the research design is a rational sequence of steps that connects the data to the research questions and eventually to the conclusion (Yin, 2003). Many methodologies exist but can mainly be categorised into four types namely positivist, interpretivist, ideological and pragmatic (Creswell & Miller, 1997). In this chapter, the research methodology and design is presented in more detail to explain the research process that was followed during the study. The research philosophy, research methodology, research approach, research strategy, data collection process, ethical considerations are further explained to provide a more comprehensive look at the research methodology.

Graduates have been exposed to testing to verify their technical, behavioural and cultural ability when entering the workplace. They are intimidated by the process and though they have the background qualifications, still lack critical skills and characteristics that are required in the workplace. The gap between curriculum and what the workplace requires can only be minimised if there is collaboration between education institutions and the workplace which currently is minimal. This results in graduates not having the skills required to successfully go through the recruitment process which tests their technical, behavioural and cultural abilities.

The RQs as presented in Chapter 1 (Table 1.1) are as follows:
RQ1: What criteria are used for identifying graduates for placements in IT companies?
RQ2: How are tests articulated to successfully employ a quality graduate?

The aim of the study was to explore how organisations determine the fit (knowledge, skills, logic and problem-solving ability) of the IT graduate when applying for a position within the company. The research explored what companies used to determine the quality graduate and how this was used in the testing, employment and further development of the graduate. The research onion (Figure 3.2) was used as a guide for the research methodology (Saunders, Lewis & Thornhill, 2019:130).

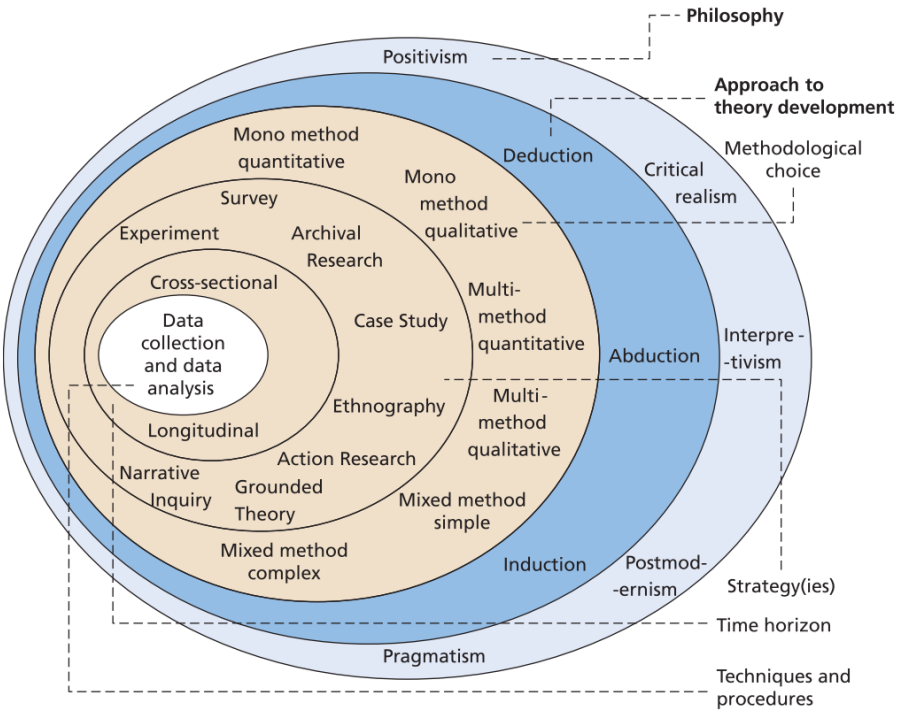


Figure 3.2: Research Onion (Saunders et al., 2019:130)

3.2 Research philosophy

Research philosophy refers to “a system of beliefs and assumptions about the development of knowledge” (Saunders et al., 2019:30). These beliefs directly affect the research design and process of the research and is key to determining which research design to apply and why (Al-Ababneh, 2020).

Research philosophy is concerned with the source, nature, knowledge development which helps the researcher to pinpoint the research design and identify the method to use to conduct the research (Bilau et al., 2018:600). It provides a theoretical base or benchmark for approaching the research (Creswell & Miller, 1997). A researchers’ philosophy is a mirror of the researchers’ values whereby a researcher could value face-to-face interaction much more than anonymous questionnaires (Saunders et al., 2019). The research philosophy consists out of an ontology and epistemology. These two paradigms are discussed in the next two subsections.

3.2.1 Ontology

Ontology can be described as “the study of being” and concerns itself with how we perceive the nature of reality to be (Bilau et al., 2018:3). The ontological stance of the researcher shapes the way the researcher sees and studies their research objects. Ontology refers to “assumptions about the nature of reality” and shapes how the researcher views their reality (Saunders et al., 2019:8). Subjectivism and objectivism are two ontological models that are

explored to tell the researcher how to look at reality and the elements reality contains (Silverman, 2013).

3.2.1.1 Subjectivism

Subjectivism implies that social phenomena are “created through the language, perceptions and consequent actions of social actors” (Saunders et al., 2019:159). Al-Ababneh (2020) states that subjectivism comes from anything but the entity to which it is assigned, which means the entity does not contribute or add to the meaning that the entity is to be imposed on by the topic or thesis. This research follows a subjective approach whereby it is imperative to understand what motivates social actors to act in a certain way whereby the social actors may interpret situations very differently within the situations they find themselves.

3.2.1.2 Objectivism

Objectivism implies that social experiences are external and not within reach. Objectivism sees objects as tangible, governed by rules and having a hierarchical structure that is external from the individuals that live in it. This structure or set of procedures do not form part of the individuals that occupy the organisation (Bryman et al., 2014). According to Saunders et al. (2019:135), objectivism “assumes that our social reality is apart from us, the social actors and that social systems exist outside of what we think, how we think and our awareness of them”. An objective view believes that the social world is truly made up of unchanging factors like family, religious beliefs and the economy individuals are born into. For this reason, objectivism was not considered as a paradigm.

3.2.2 Epistemology

Epistemology is the understanding of whether something is acceptable knowledge or not and whether the social world should be studied as is the natural sciences. Positivism, realism and interpretivism are epistemological approaches (Bryman et al., 2014). Epistemology is how the researcher sees or perceives the knowledge, whether acceptable and valid for the purpose of the study and can either be subjective or objective (Bilau et al., 2018). It refers to how the researcher perceives knowledge, whether the knowledge is acceptable or not and then how the knowledge is extended to others. The researchers’ epistemological stance drives what the researcher views as acceptable research (Saunders et al., 2019).

There are many epistemological paradigms but can mainly be categorised into four types namely positivist, interpretivist, ideological and pragmatic (Creswell & Miller, 1997:36). This research used the interpretivist approach.

3.2.2.1 Positivism

Positivism is used in a quantitative approach and sees knowledge as being separate from the individual, is objective and therefore outside of an individual. Positivists deductively start with a theory and then will try to test the theory and ensures that they are not biased thereby influencing the outcome of the test (Creswell & Miller, 1997). Positivism is an epistemological approach that "advocates applying natural science methods to study and understand social reality" (Bryman et al., 2014:41).

Positivists believe that sources of knowledge and objects must make use of the senses. Using deduction, positivists believe that the purpose of a theory is to create a theory that can be tested thereby assessing its validity. Through induction, knowledge is gained by gathering facts that is the base for fundamental hypothesis (Bryman et al., 2014). Positivism seeks to understand and explain what happens in the natural world by exploring its similarities and normative relationships between various elements (Goles & Hirschheim, 2000). Leedy and Ormrod (2015) state that positivists believe that using the correct tools, researchers can expose the absolute truth about relationships within the natural world.

3.2.1.2 Interpretivism

Interpretivism aims to "interpret or understand human behaviour rather than attempting to explain or predict it" (Babbie & Mouton, 2015:28). Interpretivism is often placed opposite positivist approaches and an Interpretivist's reality is influenced by personal feelings, involves several parts and is socially formed. The interpretivist understands that research is an interactive process made up of various elements including one's personal attributes like gender, race, biography and history (Dean, 2018).

The interpretivists' primary task of social research is describing and understanding why the action has been performed and that human activities or actions are not seen as separate from their surroundings (Armstrong, 2019). Interpretivists believe "reality is subjective, multiple and socially constructed" (Dean, 2018:3). A qualitative researcher who adopts an interpretivist approach aims at understanding and believes that the social world is strengthened by humans through their actions and interactions. It is to understand how humans who are part of a social group rule their realities through participation in the social world and how their beliefs govern their actions. It is to "understand the actors" views of their social world and their role in it (Goldkuhl, 2012:4).

Interpretivism allows the researcher to be part of the research, to interpret the research using the studies natural setting to gather information. The researcher uses their senses to gather information through social connections and places great emphasis on the interactions and how participants perceive a situation (Creswell & Miller, 1997). Interpretivism has a constructive

ontology where the empirical focus is beliefs and where knowledge is meant to be interesting and understood (Goldkuhl, 2012). Interpretivism is opposite to positivism and implies that variations between people should be respected (Bryman et al., 2014).

This research used an interpretivist research philosophy to explore and interpret the strategies that were used by organisations to evaluate the skills and competencies of graduates when entering the workplace.

3.3 Research approach

3.3.1 Introduction

There are three approaches theory development namely: i) deductive, ii) abductive, and iii) inductive approach (Figure 3.2).

3.3.2 Deductive approach

The deductive approach "concerns theoretical development that is rigorous evaluated through a number of propositions related to the theory" (Bilau et al., 2018:601).

3.3.3 Abductive approach

According to Easterby-Smith, Thorpe and Jackson (2015), an abductive approach stresses ways in which data can create a new theory than verify or refute the theory that exists.

3.3.4 Inductive approach

Creswell and Miller (1997) posit that an inductive approach has the researcher observing participants in their natural surroundings for a period of time. This allows the researcher to observe, analyse and interpret the participant so as to gain a sense of context of the participants' perceptions or views. An inductive approach begins at observing as opposed to a predefined truth. The researcher uses fixed occurrences to draw conclusions about the nature of the problem (Leedy & Ormrod, 2015). An inductive approach allows the researcher to collect data in the participants' environment, analysing the data inductively to build themes and creating meaningful interpretations of the data (Creswell, 2009). This research used an inductive research approach so as to explore the nature of the problem, build a theory based on the various discussions observed and conclude based on the conceptualised understanding of the problem.

3.4 Research strategy

3.4.1 Introduction

A research strategy is a "mechanism or strategy the researcher uses to collect, manipulate or interpret data" (Leedy & Ormrod, 2015:26). This research used multiple case studies (8) to gather data through interviews. A multiple case study tends to be harder than a single case

study but the amount of data collected from a multiple case study can result in more confident conclusions (Yin, 2011). This strategy was used to explore and to gain a thorough understanding of the context and the processes that were being put in practice. This strategy aims to generate answers to the “why”, “what” and “how” questions and is often used in the explanatory and exploratory research (Saunders et al., 2009). A multiple case study could deliberately find similarities or differences during the analysis of the data (Yin, 2011). A researcher can use a case study to explore why a person or group of people behave in a certain manner to better understand the phenomena (Bryman et al., 2014). A multiple case study established whether the findings from one case study could be found in another, thus being able to generalise from these findings. A case study requires appropriate and sufficient access to data so as to avoid biased findings and to ensure thorough observations can be concluded (Yin, 2003).

3.4.2 Unit of analysis

A unit of analysis refers to the ‘what’ of the research being done. This could refer to an object, event, person or process you are interested in researching. This study made use of an empirical research unit of analysis, which focuses on understanding human involvement or reasoning when applying a process or thought (Babbie & Mouton, 2015). In this study, the unit of analysis was the selected companies (8).

3.4.3 Unit of observation

The unit of observation refers to who will be answering the research questions posed by this study. This research interviewed HRMs (5), senior staff members involved in the recruitment of graduates (6), and the graduates (10) themselves.

3.4.3.1 Sampling technique

Two types of sampling techniques exist: random and non-random sampling. Random and non-random sampling is then subdivided into purposive and non-purposive sampling. A qualitative approach uses purposive sampling techniques which allows for in depth studying of cases rich in information. Convenience sampling is an example of purposive sampling and uses elements from a subset of a population based on accessibility and research interests (Gelo et al., 2008).

In this study, non-random, purposive and convenient sampling was used to choose the companies and participants. Companies had to employ IT graduates and companies had to agree to participate in the study. Companies were also identified using the snowballing technique. Snowball sampling is when “the researcher finds a member of a cohort and uses him or her to find other members of the cohort” (Weathington et al., 2012).

Once the companies had been identified and agreed to participate in this research, the staff involved in the testing and recruiting of IT graduates were interviewed. Twenty-one (21) interviews were conducted which consisted of senior staff (6), HR (5) and graduates (10). Table 3.1 lists the participants in this study.

Table 3.1: Companies, participants, participant group, position and years of experience

Company	Participant	Group	Position	No. of years' experience
Company 1	P1	HRP	HR Manager	28
Company 2	P2	SSP	Head of Engineering	22
	P3	GP	Software Developer	4
	P4	GP	Software Developer	3
Company 3	P5	SSP	Head of Development	22
	P6	HRP	HR Manager	10
	P7	HRP	Recruitment Lead	5
	P8	GP	Junior Software Developer	2
Company 4	P9	SSP	Development Manager	12
	P10	GP	Software Developer	1
Company 5	P11	HRP	Recruiter	13
	P12	GP	Intern	1 year and 6 months
	P13	GP	Intern	5 months
Company 6	P14	SSP	Head of Engineering	11
Company 7	P15	SSP	Development Manager	20
	P16	GP	Intern	1
	P17	GP	Intern	1
Company 8	P18	SSP	Team Lead	16
	P19	HRP	HR Manager	18
	P20	GP	Software Developer	3
	P21	GP	Software Developer	4

*P-participant; HRP-Human Resource Participant; SSP-Senior Staff Participant; GP-Graduate Participant

The sampling process of data collection allowed for the discovery of codes whereby the researcher tried to saturate the codes by ensuring that no new codes are identified.

3.5 Data collection

Data collected during qualitative research aims to have a deep understanding of the participants' frame of reference and these results in a lower extent of uniformity than with qualitative research (Gelo et al., 2008). Data collection is done after sampling had been completed. Data can either be collected as primary or secondary data and during this research. This section discusses the questionnaire and interviews as used.

3.5.1 Questionnaire

A questionnaire is an objective method used to extract information from participants in the form of a list of pre-defined questions (Weathington et al., 2012). Questionnaires can only deliver valuable responses if well planned, constructed and apportioned to ensure a high return rate (Leedy & Ormrod, 2015). Saunders et al. (2019) explain that questionnaires are set up by the researcher and have a set of answers that the participant can choose from. Questionnaires that are incorrectly set-up can result in unanswered questions, confusion and should be clear and well laid out (Babbie & Mouton, 2015). According to Creswell and Creswell (2017), questionnaires are generally used in quantitative research using close-ended questions with predefined answers. Questions should be clear and easy to complete when added to a questionnaire and the beginning of the questionnaire should be interesting enough to engage the participant (Mukherjee, 2020).

3.5.2 Interviews

Interviews are done face-to-face or telephonically using open-ended questions allowing the researcher to gather useful data and the ability to understand the beliefs of participants. To avoid biases from affecting the data, researchers use semi-structured interviews and ask interviewees the same questions in the same order so as to formulate responses in a structured method (Weathington et al., 2012). Semi-structured interviews use predetermined questions posed to the P with the possibility of asking follow-up questions to gain more insight (Leedy & Ormrod, 2015).

The researcher used an interview guide (Appendix D) with the research questions linked to the interview questions to direct all interviews. The interview guide was checked, piloted and signed off by the supervisor. Consent letters and permission had been attained from the companies and participants and the interview guide sent to the participants so as to familiarise themselves with the questions to be asked before the interview was scheduled. This allowed the participants to prepare for the interview before the interview took place.

With consent from the interviewees, the interviews were recorded and each interview was transcribed. According to Kothari (2004), interviewers must be friendly, impartial and ensure that interviews are recorded accurately and completely. Silverman (2013) mentions that interviews should always be recorded and the improvement in technology means that interviews can be played multiple times to re-listen to the interview for clarity.

3.6 Data analysis

Data analysis is the step after data collection and the main purpose of the data analysis step is to identify findings and then draw conclusions based on those findings (Babbie & Mouton, 2015). Analysing narrative data requires the researcher defines the codes as opposed to analysing numerical data, resulting in the researcher defining these codes in a logical manner

to form themes (Yin, 2011). Before the analysis took place the interviews were transcribed and mailed back to the participants in order to validate the content and transcription.

Each interview was then analysed by reading, coding and re-reading transcriptions. During this analysis, codes were identified and edited to ensure that the coding was correct and sufficient. The coding allowed for grouping parts of text (sentences or phrases), labelling these groups of text. The labels were then grouped together to form categories. Categories were further refined and themes emerge which allowed for the discussion of the themes and frame of reference of the participants (Chapter 4, section 4.6). The themes were used to discuss and expand on the findings presented.

3.7 Ethical considerations

Morality and ethics represent a "set of interconnected principles and ways for making choices" (Weathington et al., 2012:24). Ethical issues are highlighted since qualitative research involves participation with human beings and therefore cannot be taken lightly and caution is to be observed with protecting the person's honour and safety (Silverman, 2013). Weathington et al. (2012) add that ethics involves the process of studying moral behaviour and how these behaviours should be used in various situations. Ethical considerations are identified as follows: i) participants should not be harmed, ii) participation should be voluntary and informed consent must be obtained, iii) participants have the right to privacy, and iv) researchers must act with integrity and honesty (Leedy & Ormrod, 2015:120).

The research process adhered to the following ethical principles:

i) Ensured that no harm was done to any of the participants: The purpose of the study and the intent of the participants' participation were explained to assure the participants that their input was voluntary and that they had the choice to detract from the study at any time.
ii) Written consent was obtained from all participants to participate in the study: participants were informed prior to accepting participation that consent would be required to use their data in the thesis and consent was willingly received from all participants.
iii) Participants were allowed to withdraw from the research at any time: This was clearly explained in the consent letter send to participants prior to scheduling interviews.
iv) Participants were given the opportunity to validate the transcriptions that were done: All participants were sent their transcriptions and given the opportunity to validate their transcriptions.
v) Ensured that all personal details such as names, email addresses, positions and contact numbers are kept confidential to ensure that their anonymity is protected: None

of the participants real names, company names, email addresses or contact information were used in the thesis. Participants were given pseudo names and companies were presented as Company 1–8.

vi) Served the needs of the Cape Town community in a respectful manner: This research respectfully ensured participation was anonymous and courteous ensuring that those involved in the research added to the intent of ensuring that graduates, institutions and organisations receive information that would help the employment of the future workforce.

Interview questions were submitted to the Ethics committee of Cape Peninsula University of Technology for scrutiny and approval. The process and the participants' involvement in the study were explained and the researcher emphasised that participants could retract involvement at any stage of the process. Confidentiality of the participants' organisation and names were explained whereby no details of their organisation or their personal information will be mentioned in the research outputs.

3.8 Delineation

This study focused on organisations in Cape Town, Western Cape, South Africa and the key focus was to understand what methods, tools and strategies these organisations used to employ graduates who are about to enter the workplace. This research assumes that these organisations are capable of imparting valuable information to this study to provide meaningful conclusions and findings. Excluded from this research are job designations outside of the IT field like administrative, accounting and management. Job designations other than those directly in the IT field are outside the scope of this research. All other provinces were excluded from the study due to time constraints and the unwillingness of participation from organisations.

3.9 Summary

This chapter elaborated on the research philosophy, research approach, research strategy, explained the data collection and analysis processes and stated any delineations of the study. The approaches used within this chapter helped the researcher to understand how companies deem graduates fit for employment and what these companies do to further develop graduates who enter the workplace.

The research philosophy was based on a subjective approach using an interpretivist epistemology to extract meaning from participants' responses to the questions posed in the interviews. This study used an inductive qualitative research approach to observe than to use predefined truths.

Case studies were used as the research approach in an exploratory manner with the unit of analysis being eight (8) companies and the unit of observation comprising of five (5) HRMs, six (6) senior staff members, and ten (10) graduates. The sampling technique chosen was non-random, purposive, convenient sampling to select the unit of analysis (companies) and the unit of observation (participants). Companies had to be willing to freely participate in the study and a snowballing technique was used to identify the companies.

Data were collected using semi-structured interviews that were transcribed and analysed. The data analysis process included the coding, summarising, categorising and re-categorising until themes emerged which will further be presented as findings in Chapter 4.

Chapter 4 presents the data analysis and findings of the research.

4. CHAPTER 4: DATA ANALYSIS AND FINDINGS

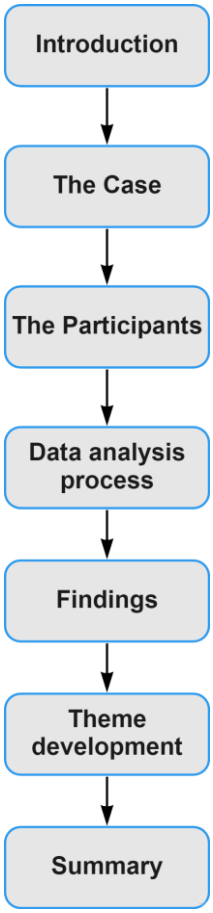


Figure 4.1: Layout of Chapter 4

4.1 Introduction

Qualitative data are non-numeric and has not been measured. It can be used across research strategies and can range from open-ended questions to transcripts that are used to derive meaningful conclusions (Saunders et al., 2009). Qualitative data analysis allows for the development of a theory by using the qualitative data and categorising responses and identifying patterns and commonality between these categories (Saunders et al., 2009).

The data analysis section of this paper endeavours to explain the process that was followed to collect the data using semi-structured interviews and present the data as findings. The data were collected from 8 companies (Company 1–8) and 21 participants were interviewed. Transcriptions of the data were done using Fireflies.io and then coded and analysed using Atlas.ti and Microsoft Excel to formulate findings.

The problem statement, aim, objective and research questions are re-iterated for ease of reference for the reader.

Problem statement: The entry-level tests (screening tests) needed to be successfully completed by the applicant (student; knowledge, skills, logic and problem-solving ability) at organisations before a job offer is made seem to be far removed from what the student is prepared for. Very little attention in the literature is given to understanding what industry defines as a quality graduate and how they go about to determine this. Little is also known whether the workplace tests that students encounter compliment or determine the true potential of the job applicants.

Aim of the study: To explore how organisations determine the fit (knowledge, skills, logic and problem solving ability) of the IT graduate when applying for a position within the company.

Objective of the study: To determine what tests are taken by the IT graduates before they are employed as part of their application process and whether these tests determine if they are quality graduates or not.

RQ1: What criteria are used for identifying graduates for placements in IT companies?
RQ2: How are tests articulated to successfully employ a quality graduate?

4.2 The case

This research used multiple case studies to gather data through interviews. Fifteen (15) companies were approached but only eight (8) companies participated in the research. These companies ranged from software development companies to service providers and the banking industry (Table 4.1). The criterion for choosing a company was that the company had to employ software graduates.

Table 4.1: Companies, industry and years in existence

Company	Industry	No. years in the industry	No. employees	Tests done per year	Tests successfully completed
Company 1	Banking	25 years	1001 – 10000		
Company 2	Market Research	50 years	1500	±600	±20 – 30
Company 3	Growth technologists	14 years	< 500	±70	±40
Company 4	Home Services	9 years	50 – 100	±100	±40
Company 5	Online Shopping	10 years	< 2000		
Company 6	Online Learning	13 years	100 – 200	±50	±25
Company 7	Media	27 years	< 250		
Company 8	Information Technology	39 years	< 18 888	±300	±60

The criteria for choosing the unit of observation were that participants had to have a deep understanding and practical experience in the field of study and that the experienced staff who made decisions around the employment of graduates had seniority within the company.

4.3 The participants

Initially the research intended to interview Human Resource Managers (HRMs) (10), Chief Technical Officers (CTOs) (10), staff involved in the recruiting of graduates (10), and the graduates themselves (10). As companies were approached and participants approached, it became clear that not all of these companies had CTOs or various other staff members involved in the recruiting of graduates other than HRMs. Eventually, the participants included five (5) HRMs, 6 senior staff (SSPs) members, and 10 graduate participants (GPs). Of the 21 participants, six (6) were females and fifteen (15) were males (Table 4.2).

Table 4.2: Companies, participants, participants' group, position and years of experience

Company	Participant	Group	Position	No. of years' experience
Company 1	P1	Human Resources (HRP)	HR Manager	28
Company 2	P2	Senior Staff (SSP)	Head of Engineering	22
	P3	Graduate (GP)	Software Developer	4
	P4	Graduate (GP)	Software Developer	3
Company 3	P5	Senior Staff (SSP)	Head of Development	22
	P6	Human Resources (HRP)	HR Manager	10
	P7	Human Resources (HRP)	Recruitment Lead	5
	P8	Graduate (GP)	Junior Software Developer	2
Company 4	P9	Senior Staff (SSP)	Development Manager	12
	P10	Graduate (GP)	Software Developer	1
Company 5	P11	Human Resources (HRP)	Recruiter	13
	P12	Graduate (GP)	Intern	1 year and 6 months
	P13	Graduate (GP)	Intern	5 months
Company 6	P14	Senior Staff (SSP)	Head of Engineering	11
Company 7	P15	Senior Staff (SSP)	Development Manager	20
	P16	Graduate (GP)	Intern	1
	P17	Graduate (GP)	Intern	1
Company 8	P18	Senior Staff (SSP)	Team Lead	16
	P19	Human Resources (HRP)	HR Manager	18
	P20	Graduate (GP)	Software Developer	3
	P21	Graduate (GP)	Software Developer	4

*P - Participant

Participants were contacted via email. The emails included why they were contacted, an explanation of the study and that their participation would be confidential. The consent documents for both the company and the actual participants in their capacity were attached in the email (Appendix D). The consent document for participants included the interview questions (Appendix A) in order for the participants to familiarise themselves with the content before the face-to-face interviews. Interviews were done via Zoom since Covid-19 regulations were applied. Each interview ranged between 20 and 30 minutes. Interviews with graduates were shorter since their interview questions were less than those of the Human Resources and Senior Staff. For the purpose of this study, the companies are to referred to as Company 1–8 and the participants as P1–P21 (Table 4.2).

4.4 Data analysis process

The data analysis process ensures that the data are collected in order to answer the research questions and ensure that the aim and objectives of the study is met. The data analysis processes followed to ensure data integrity and analysis included:

i) A folder structure (Figure 4.2) per company was created. Each folder would store the video and audio file of the recorded interview, the transcription of each interview and the consent forms and other documents received from the company.

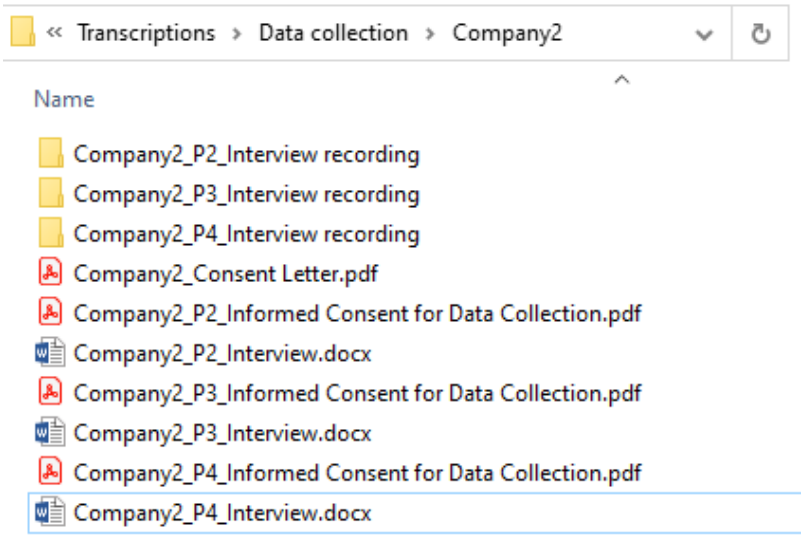


Figure 4.2: Folder structure per company containing documents and recordings

ii) Each interview was transcribed using Fireflies.ai and saved to the respective folder. Interviews were then manually checked against the audio file for grammar and accuracy. See Figure 4.3 as an example of transcription file. Transcription files were sent to the participants for validation.

RQ1: What criteria are used for identifying graduates for placements in IT companies?

SQ1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: What skills are lacking? so it's so are you speaking for, technical? I can comment on technical. Okay. Okay. So non-technical. Okay. Mainly I support engineering and product departments, and a lot of the, we receive a lot of CVs of, graduates. The shortlist is basically made on, a few different criteria. You have to look at, employment equity requirements of the company. So, and that's based on demographics of each province. The other aspect then is qualification. If it's related to the skill you're trying to hire or to fill the role with, and then they don't have any experience so the lack is the lack of actual hands-on experience in the workplace. The, the main aspect that you would look for then to make up for that is the determination and that drive to want to learn a new skill and to succeed, to be able to succeed in that environment.

Did I answer the question?

INTERVIEWER: Yes. The one lack is the lack of experience. If you can maybe broaden, when you said lack experience, do you mean in the workplace? So commercial,

RESPONDENT: Like we usually say like lack of commercial software development experience. They've done it maybe over the last three years in the degree computer science, or whatever it is, but not practical hands-on experience in, an environment that's, scaling and taking things to production. In that sense, they haven't had the experience, coding and taking things to production.

Figure 4.3: Example of transcription format

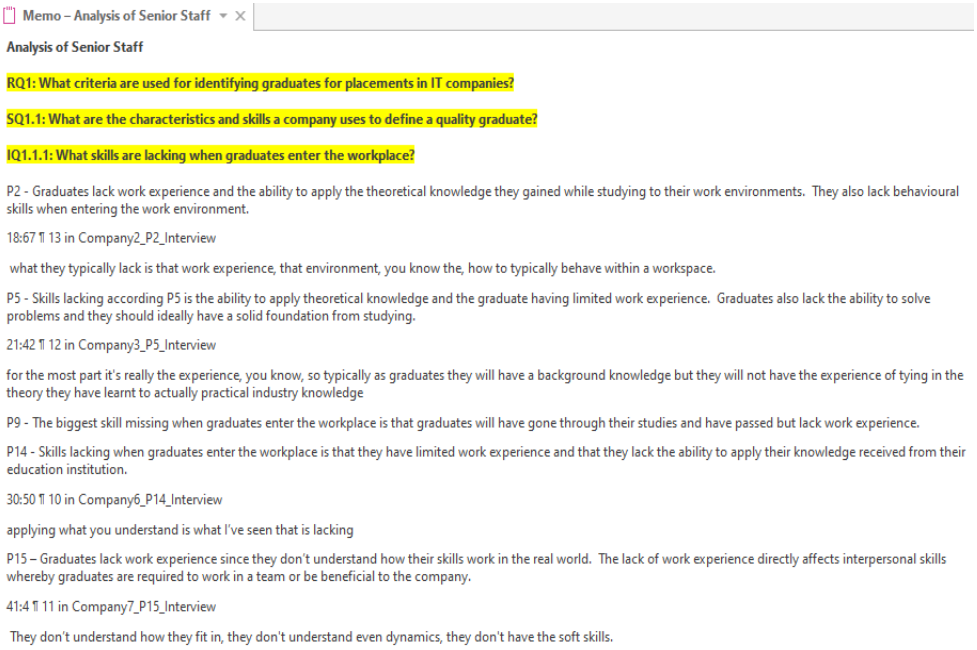
iii) A folder was created for importing documents into Atlas.ti. This folder contained duplicates of the audio and transcription file for each interview. Documents were successfully imported into Atlas.ti. Interviews were first read to understand the overall opinion of the participants. Interviews were then coded with free codes that were created whilst reading the interview. These codes were created based on the keyword concepts. Similar concepts were grouped together (Figure 4.4).

Keyword concept	Code
critical factors affecting employability of graduates	ability to adapt to change ability to focus ability to handle pressure ability to apply theoretical knowledge ability to work independantly above average technical knowledge attention to detail baseline technical skills critical thinking determined formal qualification good communication skills interpersonal skills problem solving ability self taught take initiative teamwork and collaboration time management willing to learn
1.entry assessment of IT graduates in the workplace 2.testing of IT graduates 3.entry criteria to the workplace for computer science graduates	employment decision is made first part of screening second part of screening third part of screening fourth part of screening fifth part of screening last part of screening screening test setup screening tool standard testing for graduates baseline technical test

Figure 4.4: Keywords and concepts linked to codes

Quotations were also identified to substantiate codes that were created within each interview.

iv) A memo file was created in Atlas.ti for each group of participants namely HRPs, SSPs and GPs (Figure 4.5). Each P belonged to one of the groups. Responses were summarised for each question and P. The responses were noted in the memo file pertaining to the P group. Each recording and interview was listened to and read numerous times to ensure that all codes were identified.


Memo – Analysis of Senior Staff

Analysis of Senior Staff

RQ1: What criteria are used for identifying graduates for placements in IT companies?

SQ1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ1.1.1: What skills are lacking when graduates enter the workplace?

P2 - Graduates lack work experience and the ability to apply the theoretical knowledge they gained while studying to their work environments. They also lack behavioural skills when entering the work environment.

18:67 ¶ 13 in Company2_P2_Interview

what they typically lack is that work experience, that environment, you know the, how to typically behave within a workspace.

P5 - Skills lacking according P5 is the ability to apply theoretical knowledge and the graduate having limited work experience. Graduates also lack the ability to solve problems and they should ideally have a solid foundation from studying.

21:42 ¶ 12 in Company3_P5_Interview

for the most part it's really the experience, you know, so typically as graduates they will have a background knowledge but they will not have the experience of tying in the theory they have learnt to actually practical industry knowledge

P9 - The biggest skill missing when graduates enter the workplace is that graduates will have gone through their studies and have passed but lack work experience.

P14 - Skills lacking when graduates enter the workplace is that they have limited work experience and that they lack the ability to apply their knowledge received from their education institution.

30:50 ¶ 10 in Company6_P14_Interview

applying what you understand is what I've seen that is lacking

P15 – Graduates lack work experience since they don't understand how their skills work in the real world. The lack of work experience directly affects interpersonal skills whereby graduates are required to work in a team or be beneficial to the company.

41:4 ¶ 11 in Company7_P15_Interview

They don't understand how they fit in, they don't understand even dynamics, they don't have the soft skills.

Figure 4.5: Example of memo format of senior staff

v) The data were further analysed to identify similarities and dissimilarities between responses from all participants as shown in Figure 4.6. Each section was then further divided into the groups (SSP, HR, G) to tabulate responses per group so as to explore responses between groups and then between all participants.

All	Limited work experience	Behavioural competence	Teamwork and collaboration	Interpersonal skills	Outdated or gap in curriculum	Communication skills	Problem solving skills	Critical thinking skills	Ability to apply theoretical knowledge	Time Management	Confidence	Leadership skills	Ability to adapt to change
P1	1		1	1									
P2	1	1							1	1			
P3	1	1		1	1								
P4				1		1		1	1	1			
P5	1							1					
P6	1								1				
P7													
P8	1			1									
P9	1												
P10	1								1				
P11	1												
P12	1		1		1				1				
P13	1												
P14	1			1					1				
P15	1					1			1				
P16													1
P17	1												
P18	1						1						
P19				1				1					
P20		1	1	1		1					1	1	
P21	1		1	1	1				1	1	1	1	1
	16	3	4	8	2	3	4	1	7	1	1	1	1

$S	Limited work experience	Behavioural competence	Teamwork and collaboration	Interpersonal skills	Outdated or gap in curriculum	Communication skills	Problem solving skills	Critical thinking skills	Ability to apply theoretical knowledge	Time Management	Confidence	Leadership skills	Ability to adapt to change
P2	1	1											
P5	1							1					
P3	1								1				
P14	1								1				

Figure 4.6: Example of similarities and dissimilarities between groups

From the codes and analysis of the data the findings are presented in section 4.5.

4.5 Findings

This section presents the findings from the interviews that were conducted. The data are presented for each research question (RQ), research sub-question (RSQ) and the interview questions (IQ) pertaining to each RSQ. Questions that were not asked to the GPs are stated prior to the findings of the question (GP3, GP4, GP8, GP10, GP12, GP13, GP16, GP17, GP20, & GP21).

4.5.1 RQ1: What criteria are used for identifying graduates for placements in IT companies?

4.5.1.1 RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

The purpose for asking this question is to identify what skills the participants stated that the graduates lacked when entering the workplace.

i) Senior staff

The senior staff (SSP) indicated unanimously that graduates lack work experience and said that their ability to apply theoretical knowledge is the second most lacked skill. SSP2, SSP5 and SSP14 opined that graduates also lack the ability to apply theoretical knowledge gained while studying. SSP2 added that there is a lack of behavioural skills when entering the workplace. For example, SSP2 stated that, “what they typically lack is that work experience, that environment, you know the, how to typically behave within a workspace” (Appendix D). All SSPs said that work experience is lacking when graduates enter the workplace (Figure 4.6).

The ability to solve problems is a skill that is lacking, according to SSP5 and SSP18. SSP5 said: “I guess one thing I can pick up is actually design, just being able to design a solution, visualise it and still have all the theory that you’ve actually learnt and apply that to a design that you’ve actually satisfies the requirements” (Appendix D). In addition, SSP5 stated that graduates should ideally have a solid foundation received from studying and that applying their theoretical knowledge is important. There is a gap between the knowledge that graduates have learnt versus what is expected at their first job according to SSP18, who said: “It’s just a gap in the knowledge between what they’ve learned and what is expected in when they first start their job” (Appendix D).

SSP9 said that graduates only lack work experience, while SSP2 was the only participant to mention that graduates lack time management skills. The responses from the SSPs show a clear indication that graduates lack work experience, followed by the ability to apply their theoretical knowledge. Behavioural competence, interpersonal skills, the ability to solve problems and time management were also raised as skills lacking in graduates. SSPs, however, did not see the ability to work in a team and collaborate, communication skills, critical thinking, confidence, leadership skills and the ability to adapt to change as skills lacking when graduates enter the workplace (Figure 4.7).

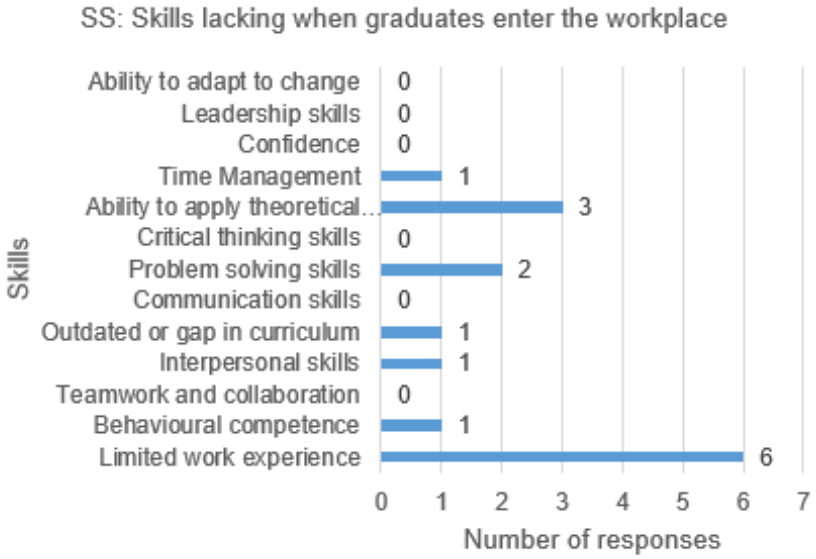


Figure 4.7: Skills lacking in graduates according to senior staff

ii) Human resources

Human resource participant (HRP) 1, HRP6 and HRP11 from the human resources (HR) group concurred that graduates do lack work experience. HRP11 mentioned the following: “Then they don’t have any experience so the lack is the lack of actual hands-on experience in the workplace” (Appendix D). In addition, HRP1 stated that graduates lack behavioural competence: “Behavioural competence of teamwork and collaboration, there’s also some interpersonal skills that they lack” (Appendix D). HRP1 and HRP19 in addition stated that graduates lack interpersonal skills. HRP6 further mentioned that graduates tend to have all the theoretical knowledge but struggle to apply the theory to everyday working:

> “So theoretically they can process information that is coming their way but really being able to, for us as, because most of our interns are placed in our tech environment so they having to code and quality check so for them, they are able to do that but to put it through to a staging environment is very difficult and I think we spend at least extensive time with them in the first 3 months, getting them to understand the full concept of the coding and having them play around with broken code and seeing if they are able to unpack that” (Appendix D).

The responses from the HR participants show that the graduates lack work experience followed by interpersonal skills. Behavioural competence, teamwork and collaboration and the ability to apply theoretical knowledge were also raised as skills that graduates lack. It is important to mention that HRP7 did not answer the question. HRPs however did not see communication skills, critical thinking, time management, confidence, leadership skills and the ability to adapt to change as skills lacking when graduates enter the workplace (Figure 4.8).

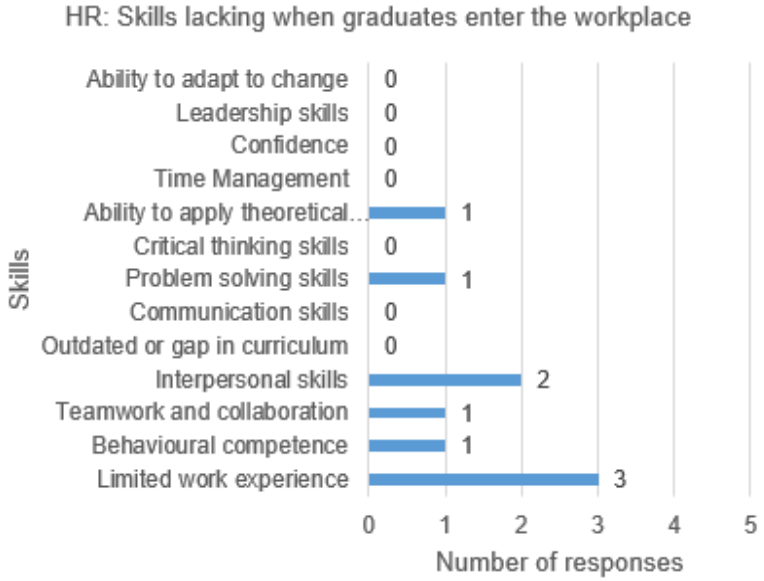


Figure 4.8: Skills lacking in graduates according to HR staff

iii) Graduates

GP3, GP8, GP10, GP12, GP13, GP17 and GP21 stated that graduates lack work experience and exposure to various policies and processes within a company. Graduates also have limited work experience. Methodologies are often taught in the workplace where graduates first exposure to these methodologies are, according to GP21, “getting used to that idea of how things are, about managing stuff, cause it’s not really about just code on that point, how to manage that code and all of those things” (Appendix D). GP8 said: “They don’t necessarily understand and are good at navigating the business world in terms of meetings, how the work is done outside of coding” (Appendix D). GP10 agreed, stating that more preparation is done to keep graduates in academia and not to enter the workplace: “I feel like, computer science as a degree, does not necessarily prepare graduates for the workplace, but rather prepares them to keep on going into academia” (Appendix D).

Interpersonal skills rank after work experience and five (5) GPs indicated that graduates lack interpersonal skills when entering the workplace (Figure 4.9). GP4 mentioned that, “something I wasn’t told really, wasn’t told how to interact professionally in a sense, besides from a course

on varsity where we had to write cover letters and stuff but there wasn't like the soft skills" (Appendix D).

Communication skills and the ability to apply theoretical knowledge are tied as the third skill graduates lack. GP3 said the following: "Communication was severely lacking within my university degree. It's a huge part of software engineering and how we communicate with different components and different people within the job space, it's very important and not something I completely understood" (Appendix D). GP20 and GP21, employed at Company 8, stated that teamwork and collaboration are lacking. GP20 said: "Actually the first thing I'm thinking that the leadership and the ownership of the work and the communication and the teamwork" (Appendix D). GP21 stated: "The first thing that's quite obvious is the collaborative work" (Appendix D).

GP3 and GP12 opined that the curriculum is outdated or that there is a gap in the curriculum, and GP4 mentioned that problem solving and critical thinking skills are lacking. GP16 indicated that graduates lack the ability to adapt to change, while GP20 opined that graduates lack leadership skills. GP21 stated that graduates lack confidence and GP3 mentioned that graduates who are confident will pick up communication skills more easily than graduates who do not possess confidence, saying, "people that might not have the kind of confidence that I do I can see it will be a lot more difficult to adopt that kind of process" (Appendix D).

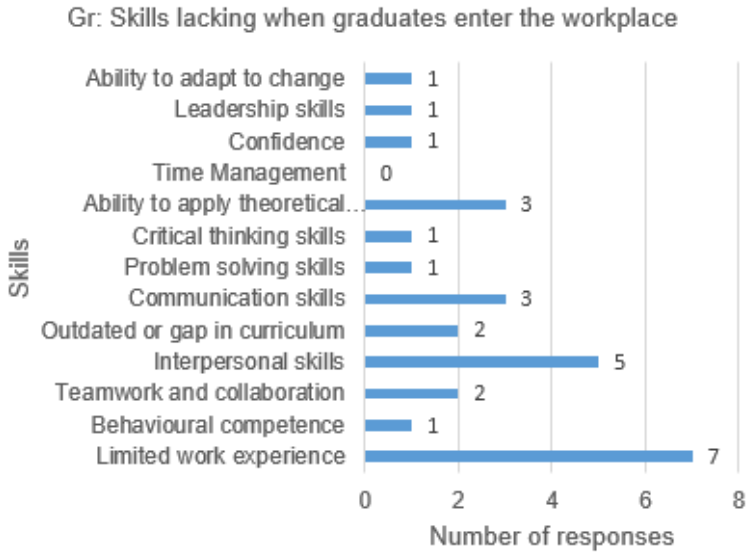


Figure 4.9: Skills lacking in graduates according to graduates

The majority of the participants (P1, P2, P3, P5, P6, P8, P9, P10, P11, P12, P13, P14, P15, P17, P18, & P21) said the graduates lack work experience (Figure 4.10) when entering the workplace, followed by the ability to apply theoretical knowledge and interpersonal skills,

problem solving skills, teamwork and collaboration, and communication skills. All the other skills were also mentioned but not ranked high by the participants.

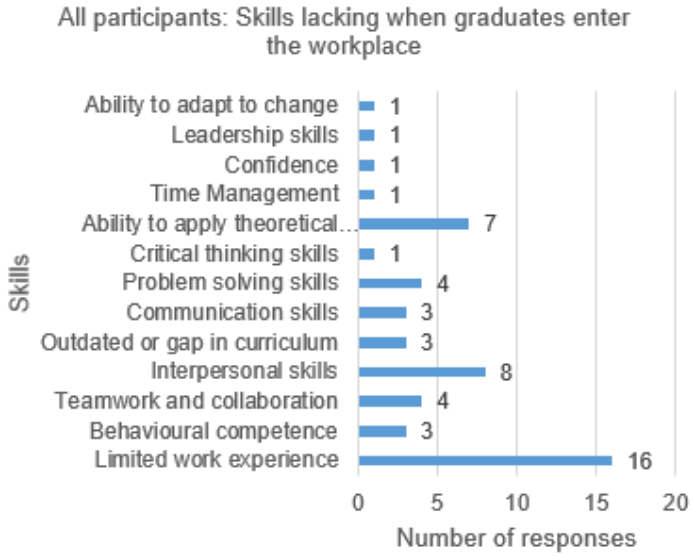


Figure 4.10: Skills lacking in graduates according to all participants

Finding 1: The skill most lacking is interpersonal skills.

Finding 2: The second most lacking skill is the ability to apply theoretical knowledge.

Finding 3: Teamwork and collaboration as well as problem solving skills were combined as the fourth most lacking skill.

Finding 4: Communication skills and behavioural competence have been identified as skills lacking when graduates enter the workplace.

Finding 5: The lack of work experience was identified as the most pressing issue when graduates enter the workplace.

Finding 6: There is a gap between what graduates learn at an education institution and what is expected in the workplace.

Finding 7: Critical thinking skills, time management, confidence, leadership skills and the ability to adapt to change are lacking the least.

IQ 1.1.2: What in your opinion is a quality graduate?

This question was asked to understand what the participants deemed a quality graduate to be that would be used to add to the criteria of placing these graduates.

i) Senior staff

The SSPs indicated that teamwork and collaboration, taking initiative, communication skills, a willingness to learn, a good attitude, problem solving ability, and interpersonal skills are equally indicative of a quality graduate. SSP2 and SSP15 agreed that interpersonal skills are traits of a quality graduate. SSP2 stated the following: “It’s the soft skills. Its little things. Comes down to workplace etiquette in the end” (Appendix D). SSP2 also mentioned that behavioural competence is important when defining a quality graduate: “The behavioural aspects are a lot more important to me at least upfront because technology I can teach but behavioural is a bit more difficult” (Appendix D).

SSP9 and SSP18 indicated problem solving ability as an attribute of a quality graduate. SSP9 stated: “There’s this idea called spatial reasoning and spatial reasoning is the ability to take a circumstance or scenario and almost set yourself outside of it or beside it, and then be able to look at it from various different angles and perspectives” (Appendix D).

According to SSP14 and SSP18, a quality graduate should have a good attitude. SSP14 opined that in addition to having a good attitude, a quality graduate is someone who possesses communication skills and a balance between technical and behavioural competence. SSP5 stated that a quality graduate at Company 3 is someone who is self-taught, determined to excel in their chosen career, and is willing to learn: “You need to code every day and you don’t need a job for that, you just need a computer and you don’t even need a team because there are a lot of open-source projects out there” (Appendix D). SSP18 furthermore pointed to the willingness to leaning as an attribute of a quality graduate, but a quality graduate should also be able to apply their theoretical knowledge and solve problems.

SSP14 and SSP15 pointed to communication skills as an attribute of a quality graduate. SP14 stated: “They have the theoretical knowledge around it but then on top of that their attitude and their soft skills, communication as well as the behaviour they have, so if they are very forthcoming and positive, I think that that’s what makes a quality graduate” (Appendix D).

Being able to take initiative is what makes a quality graduate, according to SSP9 and SSP15. SSP15 said the following: “Can you follow instruction and what works hand in hand with follow instruction is can you think for yourself, can you take the initiative?” (Appendix D).

Teamwork and collaboration was mentioned by SSP2 and SSP15. SSP2 said: “When you working as a team with software developers they often work within a team and that often means that everybody has to play by the rules and when one person doesn’t play by that rule then the team is thrown out of sync” (Appendix D).

Among the six (6) SSPs, accountability, the ability to apply theoretical knowledge, culture fit, balance between behavioural and technical competence, behavioural competence, being self-taught, time management, determination and having baseline skills were each highlighted only once (Figure 4.11).

Having a formal education, knowledge of coding languages, a solid foundation from studying, ability to handle pressure, ability to adapt to change, attention to detail, above average technical ability, confidence, work experience and humility were not mentioned as being attributes of a quality graduate.

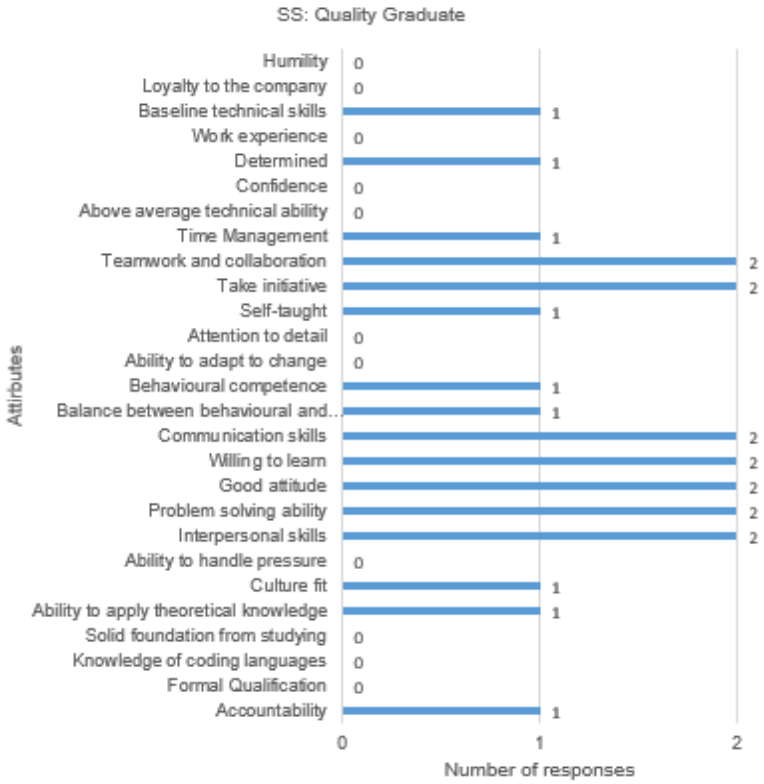


Figure 4.11: A quality graduate's attributes according to SSPs

ii) Human resources

HRPs pointed to a formal qualification as the most important contribution towards determining a quality graduate, followed by teamwork and collaboration, the ability to take initiative, being self-taught and willing to learn and having the ability to solve problems.

Of the five (5) HRPs, it was HRP7, HRP11 and HRP19 who stated that a formal qualification contributes towards being a quality graduate. HRP19 indicated that a "quality graduate is someone who has completed their qualification. It doesn't matter if it's taken longer, but the fact that they have completed it is absolutely critical" (Appendix D). HRP7 said: "Someone with an honours degree in computer science, that's a good indication for us" (Appendix D).

HRP1 and HRP7 identified the ability to solve problems as an attribute of a quality graduate. HRP1 opined: “For me, talks to their problem solving and conceptual thinking ability and also, and an individual is fairly balanced in terms of their behavioural style, so they’re able to work independently and they could work with in a team” (Appendix D). HRP1 also mentioned that graduates have to work well in a team and collaborate while maintaining a balance between behavioural and technical competence.

HRP6 and HRP19 mentioned that a quality graduate has the willingness to learn. HRP6 said graduates will be hungry to learn, are ready for challenges, and want to invest their time in their job and push through challenges: “Somebody who is hungry and ready to learn, who can take on challenges” (Appendix D). HRP19 further mentioned that graduates do not need to be ‘A’ students, but they must possess the passion and eagerness to learn, and that the key to employing graduates is having a good attitude and being open minded. Having part-time work in any field is vital to help the graduate interact with others, according to HRP19.

Being self-taught is identified as an attribute of a quality graduate, according to HRP7 and HRP11. HRP11 opined that “the ideal candidate would be someone who’s got some hands-on experience, whether they’ve dabbled with it on their own, done some work on their own on the side” (Appendix D).

HRP1 and HRP7 posited that a quality graduate has the ability to take initiative when faced with tasks in the workplace. HRP7 also mentioned that a quality graduate will have knowledge of the coding language required by the company and is humble and curious: “Someone with a GitHub account who has done a lot of projects and also just people who are looking at projects on the side that they can work on that they can practice on, curious people that’s something we look at as well” (Appendix D).

HRP1 and HRP6 placed teamwork and collaboration among the top attributes of a quality graduate. HRP6 said: “If somebody is able to adapt to that change then embrace it and you know, working collectively with the team and the loyalty is there then that would be a great resource in terms of someone joining the team as a graduate” (Appendix D).

Participants from the HRP group did not indicate accountability, a solid foundation from studying, culture fit, the ability to handle pressure, communication skills, attention to detail, time management, above average technical ability, confidence, determination, baseline technical skills and humility as attributes that quality graduates should have. A formal education, followed by a graduate’s ability to solve problems, the willingness to learn, being able to take initiative, teamwork and collaboration, and self-learning were indicated as important by the HRPs who participated in the study.

Knowledge of coding languages, the ability to apply theoretical knowledge, interpersonal skills, having a good attitude, balance between behavioural and technical competence, behavioural competence, the ability to adapt to change, work experience and showing loyalty to the company were attributes identified as the third most important attributes a quality graduate should have (Figure 4.12).

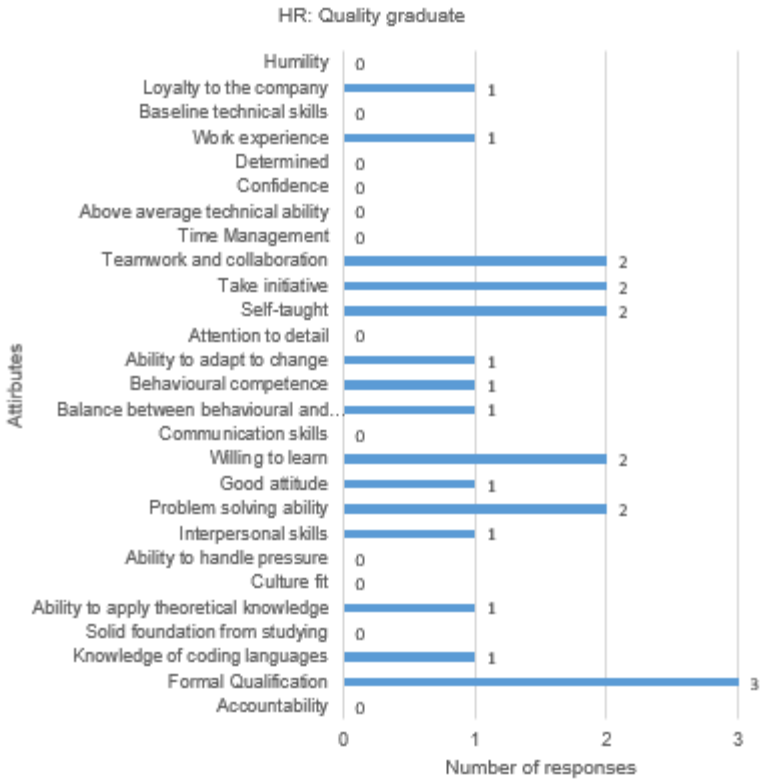


Figure 4.12: A quality graduate's attributes according to HRPs

iii) Graduates

According to the GPs, taking initiative, being willing to learn, having the ability to solve problems, and possessing interpersonal skills are the attributes most expected of a quality graduate. Confidence, having an above average technical ability, the ability to handle pressure, and the ability to apply theoretical knowledge were identified as the second highest set of attributes a quality graduate must have. GP10, GP13 and GP17 mentioned that the ability to solve a problem is an attribute of a quality graduate. GP10 stated: "I think above all, if you can't be a problem solver, then you can't be a software dev. problem solving skills" (Appendix D). GP17 added that a quality graduate should be able to think, not necessarily knowing how to do a task, but being able to start the problem solving thinking process.

The willingness to learn was stated by GP12, GP13, and GP20 as an attribute of a quality graduate, with GP12 saying the following: "I think a quality graduate as far as I am concerned would be someone who's just keen to learn new things" (Appendix D). GP13 added that

graduates need to persevere and be determined to meet their goals in addition to being willing to learn: “It’s just your willingness to actually learn and be open to new things and new skills” (Appendix D).

GP4, GP10 and GP13 mentioned that the graduate’s ability to take initiative is the key to being a quality graduate. GP4 said: “Someone who can boldly take on work and ask questions and not be scared to do that and also ask questions and be inquisitive. It helps the employee as well as the employer, so it works both ways, I’m sure my manager really appreciates it when I ask questions” (Appendix D). GP4 furthermore mentioned that a quality graduate is someone is confident enough to ask questions irrespective of whether the question placed them outside their comfort zone.

Interpersonal skills were mentioned by GP3 and GP10, with GP3 stating the following: “On the other side of the spectrum is your inter-human communication skills, how you interact with other people and how they understand what you saying” (Appendix D). A quality graduate is required to have communication skills, according to GP3 and GP21. GP3 stated that, “from an organisational perspective it’s easier to work with someone who has both the technical skills as well as a little bit of the communication skills rather than extreme ends of the spectrum” (Appendix D). Graduates should be a culture fit for the company, according to GP21.

GP21 said that graduates should have the ability to apply theoretical knowledge and opined that “the big thing is to apply your theory. So many people, everyone who’s a graduate: The assumption is they passed some theoretical test and they know some theory” (Appendix D). GP8 mentioned that graduates should also have an above average ability and agreed with GP21: “If they don’t have the ability to extrapolate from that base knowledge, they are going to fall flat pretty fast” (Appendix D).

GP20 and GP21, both GPs of Company 8, agreed that quality graduates should have the ability to handle pressure. GP21 mentioned that software development can be stressful and often the graduate has to work under pressure, “You need to still maintain your relationships with your colleagues and everyone else around. So if you can actually, you can relate with them under pressure and they are still good” and “the point is applying knowledge and they can handle pressure perfectly well” (Appendix D).

Having an above average technical ability is an attribute that a quality graduate should have, according to GP3 and GP8. GP8 elaborated as follows: “A quality graduate is someone who has a good overview of the landscape they are working in so they have technical ability, they’ve got good fundamentals and they have the ability to learn fast. That’s the biggest one I wanted to mention” (Appendix D).

GP4 and GP16 mentioned that a quality graduate should be confident in their abilities and the way they deal with others. GP4 identified a quality graduate as follows: “Someone who is confident, I think confidence in your ability even though you I felt out of my depth a lot of the time but I noticed I was with a couple of guys who started at the same time as me and some of the guys shined because of how they took on tasks” (Appendix D).

Humility, determination, teamwork and collaboration, attention to detail, the ability to adapt to change, behavioural competence, a balance between behavioural and technical competence, culture fit, and a solid foundation from studying were each highlighted only once per attribute among the ten graduate participants (Figure 4.13). GP16 identified a quality graduate as being assertive yet humble and respectful of self and others by stating the following: “A quality graduate is a person who is assertive yet also humble, respectful yet also respectful and also have also self-respect” (Appendix D). None of the GPs mentioned loyalty to the company, baseline technical skills, work experience, time management, being self-taught, having a good attitude, having knowledge of coding languages, a formal qualification, and being accountable as attributes of quality graduates.

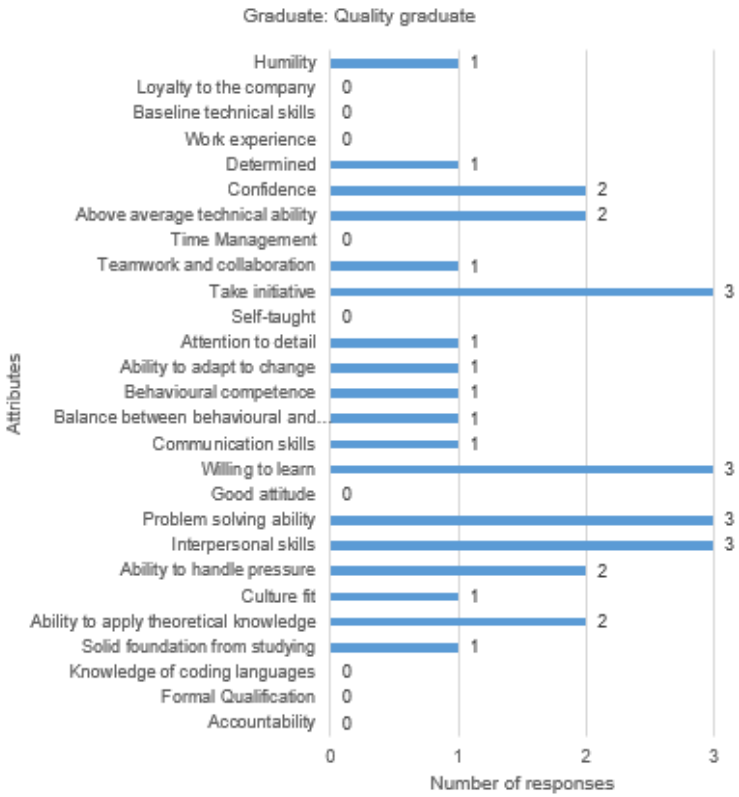


Figure 4.13: A quality graduate’s attributes according to GPs

All participants said the most valuable attributes for a quality graduate are: the ability to take initiative when faced with tasks, having a willingness and eagerness to learn, and being able

to think in order to solve problems. Teamwork and collaboration and interpersonal skills were stated as the second most valuable attributes for a quality graduate (Figure 4.14).

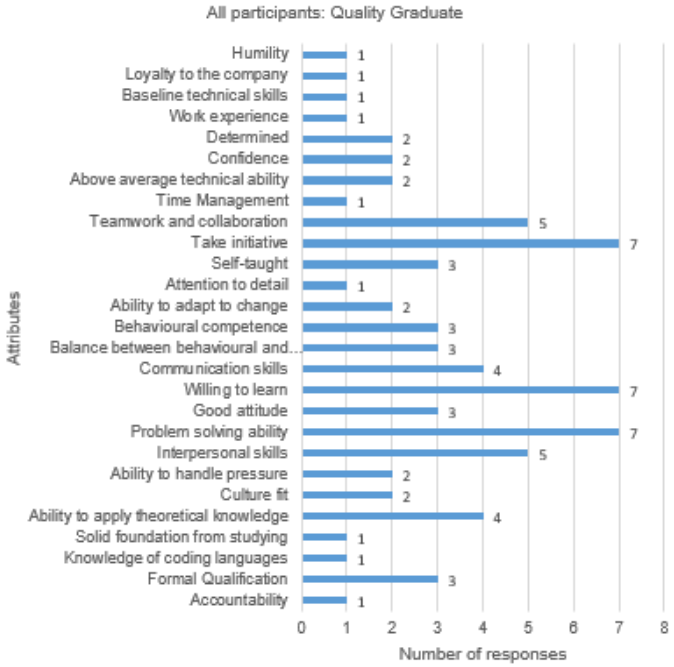


Figure 4.14: A quality graduate's attributes according to all participants

Finding 8: A quality graduate takes initiative, is willing to learn and has the ability to solve problems.

Finding 9: A quality graduate has interpersonal skills and can work in a team and collaborate.

Finding 10: A quality graduate does not have to have work experience even though it is lacking when graduates enter the workplace.

Finding 11: Communication skills and the ability to apply theoretical knowledge is indicative of a quality graduate.

Finding 12: Work experience does not have to be experience in the graduate's field of study.

Finding 13: Confidence and humility are soft skills other than interpersonal and communication skills stated as attributes of a quality graduate.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

The objective of this question was to determine what characteristics the participants identified to define a quality graduate. This question was not posed to the GPs.

i) Senior staff

The most prevalent characteristic SSPs in companies look for in a graduate is being willing to learn. This characteristic is closely followed by having a good attitude. Being humble and a good culture fit, having the ability to apply theoretical knowledge, taking initiative, being able to work in a team and collaborate, and having determination were also identified as characteristics that companies look for when employing graduates.

SSP2, SSP5, SSP9, SSP14 and SSP18 identified the willingness to learn as a characteristic when employing a graduate. In this regard, SSP14 stated: “Grit and a willingness to keep learning are two of the most important characteristics that I would look for in a graduate” (Appendix D).

SSP5, SSP14 and SSP18 said they look for a good attitude as a characteristic when employing graduates. SSP5 posited: “I’m looking for that attitude of go-getter, hungry, you know, can do attitude and typically such a person doesn’t fit in our structure, they arrogant, they are selfish they are the ones who want to push forward at the expense of everybody else” (Appendix D). SSP18 indicated “professionalism, ambitious, positive attitude, willingness to learn” (Appendix D).

Determination is a further characteristic identified by SSP9 and SSP14 when employing graduates. SSP14 stated:

> “This also depends entirely on the qualification and the determination of the graduate they could’ve gone beyond the basic requirements within their studies and that just puts them a cut above the rest. I would say a general blanket statement is that those that do come into the industry are still new and they need to be given the opportunity to apply the knowledge that they’ve learnt from a basic point of view because I see like, what you study, from my side that has been through the tertiary education process and still am in this after 12 years, it requires constant learning so once you finish that point you have to keep going and push forward” (Appendix D).

SSP2 and SSP9 identified teamwork and collaboration as required characteristics when employing graduates. SSP2 said: “…that you’ve executed a piece of work and that you’ve got feedback on it and then taking that feedback and what’s making that work better. So that whole process of reviewing with the peer-to-peer system” (Appendix D). SSP9 agreed, stating the following: “Obviously, the ability to work in a team is important” (Appendix D).

The ability for a graduate to take initiative is an employable characteristic, according to SSP5 and SSP9. SSP9 elaborated: “somebody who can take the initiative, somebody who’s a self-starter, somebody who really is passionate about their craft and passionate about the software that they’re creating and not just passionate in the way that they write code, but also passionate

about: when you look at engineering or software engineering in general, there's almost like an entire philosophy of thoughts around it" (Appendix D).

SSP2 and SSP14 pointed to the ability to apply theoretical knowledge as a characteristic for employability of graduates. "Showing eagerness and a willingness to learn as well as balancing the act of knowing what they have studied and using that basic knowledge and skill set to help them and basically build upon" (SSP14, Appendix D). SSP2 added that critical thinking and the ability to adapt to change are also characteristics identified when employing a graduate.

Fitting into the culture of the company is a characteristic identified by SSP5 and SSP9 as important to look for during the screening process. In this regard, SSP5 said: "We are hiring a person and that person has to fit into a community that we are building in a certain way, so they need to fit into what an Impact community member should be like" (Appendix D).

SSP5 and SSP15 agree that humility is a characteristic they look for when employing a graduate. "So being humble is very important to me in terms of your skills and just who you are" (SSP15, Appendix D). SSP5 further concurred:

> "I really want smart guys who are humble and hungry. So, you can tell this person wants to succeed but at the same time has no ego at all or very little ego and he is always available when someone wants to ask something, even if it's very low level" (Appendix D).

Although various characteristics were identified, the ability to adapt to change, critical thinking, interpersonal skills, being self-taught, having behavioural competence, the ability to solve problems, honesty, being forward thinking and hardworking, and being reliable and confident were also characteristics mentioned by the SSPs, but these characteristics scored lower (Figure 4.15).

According to SSP15, graduates should be forward thinking, hardworking, reliable and have confidence. "You don't want cocky, arrogant people. You can be humble, but you can be confident in what you doing" (SSP15, Appendix D).

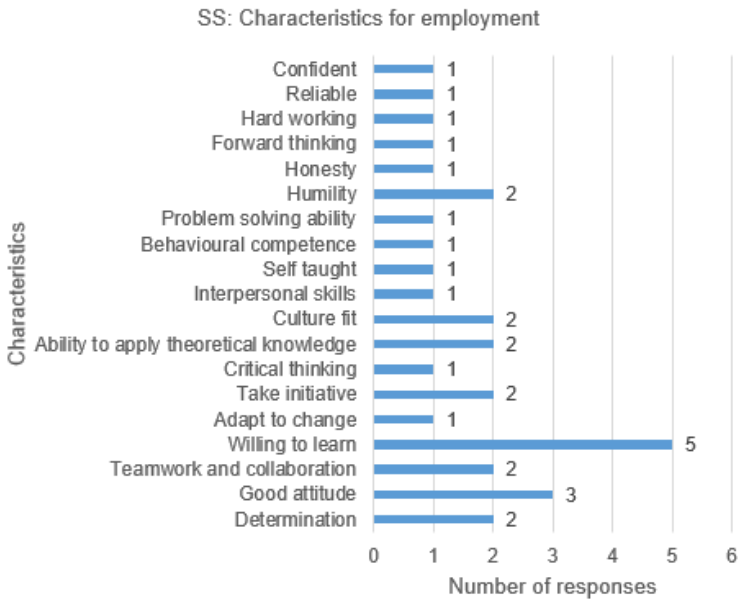


Figure 4.15: Characteristics required for employment according to SSPs

ii) Human resources

HRPs agreed with the SSPs, but posited that the ability to adapt to change and taking initiative are equally important characteristics for employability (Figure 4.16). Being humble and having the determination to succeed were identified as the second most important characteristics that companies look for when employing graduates. Teamwork and collaboration were also indicated. However, HR staff did not mention confidence, reliability, being hard-working and forward thinking, honestly, problem solving ability, behavioural competence, being self-taught, interpersonal skills, being a culture fit, the ability to apply theoretical knowledge, and having a good attitude as characteristics companies look for when employing graduates.

According to HRP6 and HRP7, both from Company 3, as well as HRP11, a characteristic they look for when employing graduates is graduates' willingness to learn. "The product that we have is very complex so you would need to invest your time in really understanding the business as a whole and not being one minded" (HRP6, Appendix D). "People who are humble, hungry and smart. Those are characteristics that we look for in graduates" (HRP7, Appendix D).

The ability to adapt to change is a characteristic identified by HRP6 and HRP7, both from Company 3, as well as HRP19. HRP6 added that graduates need to go the extra mile and not be too focused on what their job description says, but to be flexible when is required. Graduates should also have leadership qualities, according to HRP7, in addition to being able to adapt to change.

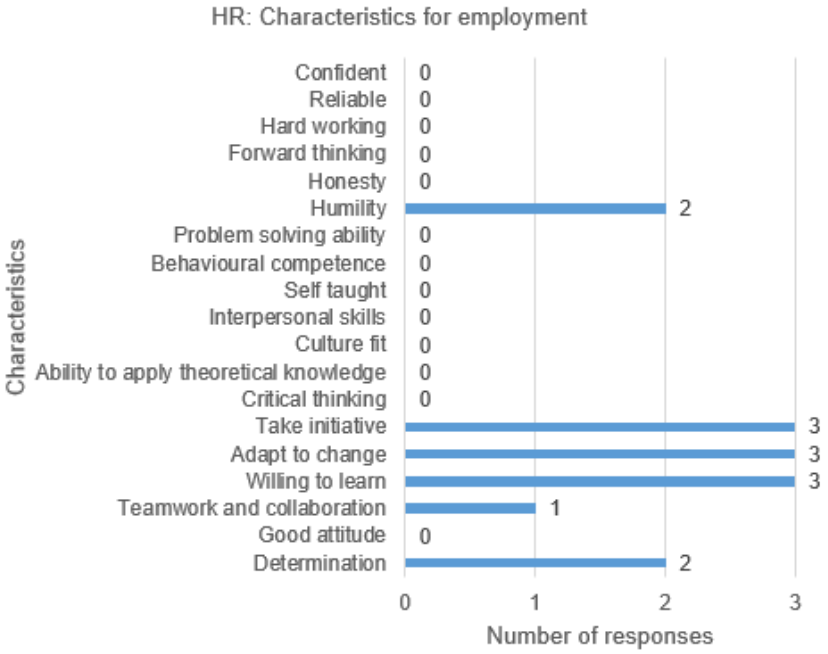


Figure 4.16: Characteristics required for employment according to HRPs

HRP1, HRP6 and HRP19 identified taking initiative as a characteristic for employment. “We look for, one for graduates that are energetic and we try and look for ones that have done a bit more and not just past their degree. We’re looking for people that have quite a passion for things” (HRP19, Appendix D). HRP19 furthermore added that taking initiative does not stop in the working environment but expands outside the work environment (Figure 4.16).

Determination was identified by HRP7 and HRP11 as characteristics for employment, with HRP11 stating: “So, the ideal candidate would be someone with great enthusiasm, that goes longer than, actual experience sometimes because that person has such determination to learn this, that that individual is going to do whatever it takes to make this work” (Appendix D) (Figure 4.16).

HRP6 and HRP7, both from Company 3, agreed that humility is a characteristics of employment with P7 stating that graduates should not be arrogant but hungry, smart and above all humble (Figure 4.16)..

Figure 4.17 shows that a willingness to learn is a clear characteristic across all HRPs and SSPs. Taking initiative is the second most important characteristic identified, followed by humility, the ability to adapt to change, and determination.

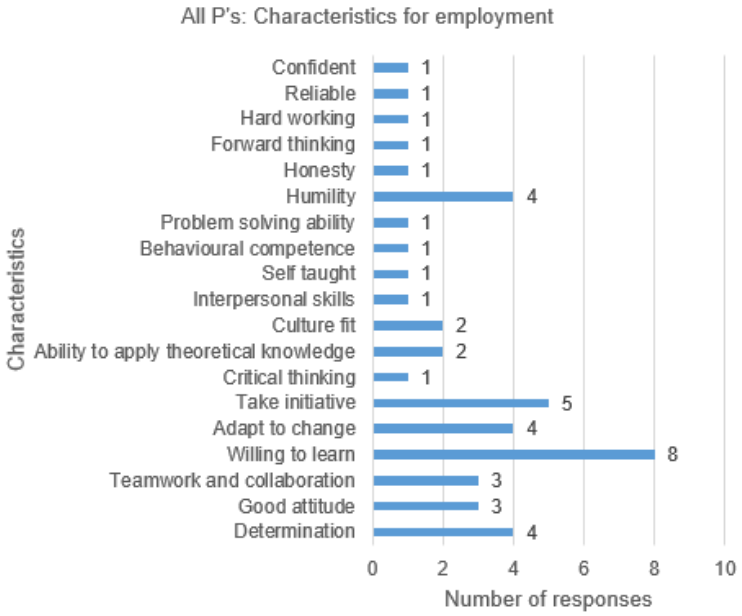


Figure 4.17: Characteristics required for employment according to all participants

Finding 14: The most important characteristic for employability is a willingness to learn.

Finding 15: Taking initiative is the second most important characteristic for employability.

Finding 16: Humility, determination and being able to adapt to change are identified as key characteristics for employment followed by teamwork and collaboration and having a good attitude.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

This question was asked to assess whether these skills were indeed the critical skills required by the graduates who apply for software development positions.

i) Senior staff

SSPs identified the ability to solve problems as the most critical skill graduates should have, followed by the ability to take initiative and a willingness to learn.

SSP2, SSP5, SSP9 and SSP18 pointed to problem solving as the most important skill, with SSP18 stating: “Definitely problem-solving and being able to innovate a solution around the problem” (Appendix D).

The ability to take initiative has been identified by SSP9, SSP14 and SSP18 as a critical skill. SSP14 mentioned: “Definitely on top of those two hard skills, I would say soft skills is a definite.

Being able to, be worked with a team, be open in terms of communication, being proactive" (Appendix D). SSP2, SSP5 and SSP9 indicated that the willingness to learn is a critical skill when graduates apply for a software development position. SSP2 elaborated: "At a graduate level I would say that is it, critical thinking and logical, ability to think logically, ability to have that continuous learning and improvement process" (Appendix D).

Formal education (SSP5 & SSP14), teamwork (SSP14 & SSP15), communication skills (SSP5 & SSP14), critical thinking (SSP2 & SSP5), interpersonal skills (SSP9 & SSP14), the ability to apply theoretical knowledge (SSP18), attention to detail (SSP5), the ability to work independently (SSP15), the ability to handle pressure (SSP15), and baseline technical skills (SSP15) were all identified as critical skills (Figure 4.18). The SSPs did not mention adapting to the changing environment, above average technical knowledge, the ability to focus, determination and time management as critical skills when graduates apply for a software development position.

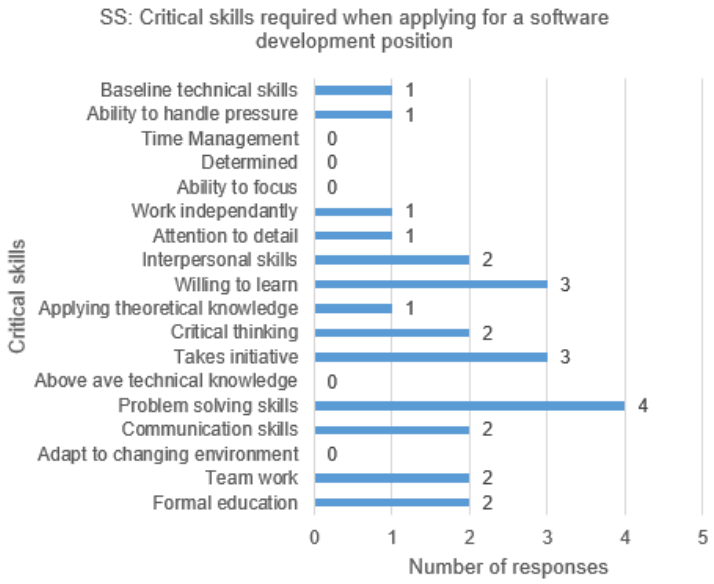


Figure 4.18: Critical skills required when applying for a software development position according to SSPs

ii) Human resources

Four (HRP6, HRP7, HRP11 & HRP19) of the five HR participants stated that a formal education is critical when graduates apply for a software development position (Figure 4.19). HRP11 mentioned he following: "Critical skills that are required by graduates are that they have to have a formal education, have the ability to solve problems and have good communication skills" (Appendix D). HRP19 added the following to the importance of a formal qualification: "What we will say is that these yearlong programs or these short-term certificate programs are just not sufficient" (Appendix D).

Communication skills and problem solving skills were identified as the second most critical skill for the HRPs (HRP1, HRP11, HRP19) when graduates apply for a software development position. “That sound very sound technical knowledge, good communication skills, problem solving ability. And, as I say, they have to be action oriented, so they can take instruction and then use the initiative and run with it and deliver” (HRP1, Appendix D). “We generally look at people with like good computer science and mathematics background, and then strong problem-solving skills, strong communication skills, and then strong understanding of object-oriented programming languages” (HRP11, Appendix D).

HRP7 and HRP19 said that graduates need to have the ability to work in a team and adapt to the changing environment of the workplace. HRP1 indicated that above average technical knowledge and the ability to take initiative are critical skills that graduates must have when applying for a software development position. HRP7 stated the following: “someone who can work in [an] agile environment where things are always changing” (Appendix D).

HRPs did not mention critical thinking, the ability to apply theoretical knowledge, a willingness to learn, interpersonal skills, attention to detail, the ability to work independently, the ability to focus, determination, time management, the ability to handle pressure, and having baseline technical skills as critical skills when graduates apply for software development positions.

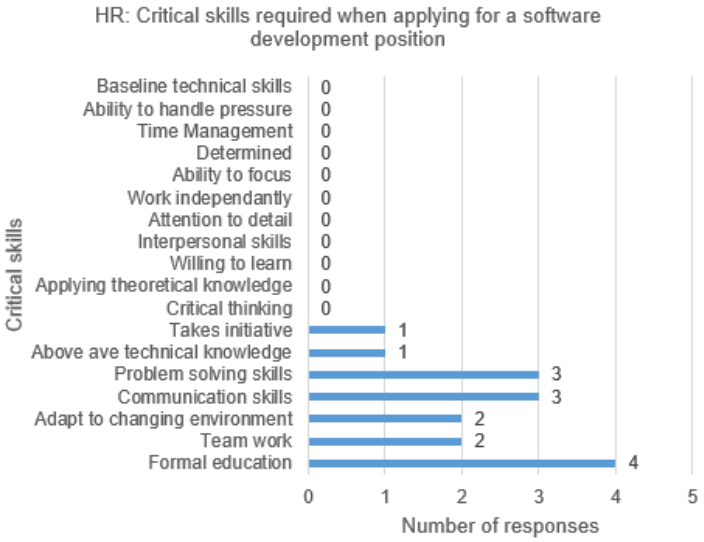


Figure 4.19: Critical skills required when applying for a software development position according to HRPs

iii) Graduates

GPs GP4, GP8, GP12, GP13, GP20 and GP21 identified the ability to solve problems as the most critical skill that graduates are required to possess when applying for software development positions. GP12 and GP13, both from Company 5, also argued that problem solving is a critical skill. GP13 stated: “Obviously, it’s impossible to know everything, but you

need that ability to find information and find solutions. I think that's an important skill to come in" (Appendix D). GP20 stated the following: "The critical thing is like first the app to do the mathematical aptitude thing and the problem solving skill" (Appendix D).

An above average technical ability is a critical skill, according to GP3, GP8, GP13 and GP16 (Figure 4.20). "A quality graduate is someone who has a good overview of the landscape they are working in so they have technical ability, they've got good fundamentals and they have the ability to learn fast. That's the biggest one I wanted to mention" (P8, Appendix D).

GP4, GP13 and GP20 mentioned that teamwork is a critical skill that graduates should have. "I think being a good team member is really helpful" (GP4, Appendix D).

The ability to communicate effectively is a critical skill, according to GP3, GP10 and GP13. "You need people skills in the workplace as well. You need to be able to communicate with people, to work with others, work in teams. You need to be able to ask for help" (GP13. Appendix D).

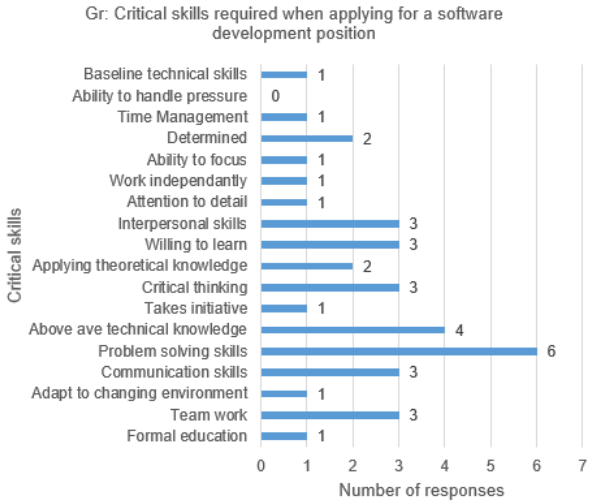


Figure 4.20: Critical skills required when applying for a software development position according to GPs

GP3, GP16 and GP17 identified critical thinking as a critical skill. GP3 mentioned: "So critical thinking a fundamental knowledge of how computers process instructions and critical thinking I think that's kind of the core skills" (Appendix D). The willingness to learn was mentioned by GP10, GP17 and GP20 as a critical skill. GP20 furthermore stated that attention to detail and time management are critical skills that graduates should have (Figure 4.20).

GP13, GP16 and GP21 mentioned interpersonal skills as critical skills needed by graduates when applying for a software development position. GP21 also indicated that a formal qualification, the ability to take initiative, being able to work independently, and the ability to

focus are critical skills when graduates apply for a software development position. GP16 identified the graduate's ability to adapt to a changing environment as a critical skill (Figure 4.20).

GP4 and GP8 stated that the ability to apply theoretical knowledge is a critical skill. GP8 added that graduates need to have baseline technical skills, while GP16 and GP21 agreed that determination is a critical skill (Figure 4.20).

Problem solving skills was identified as the most critical skill across all participants, with communication skills the second most critical skill when graduates apply for a software development position. All participants said the ability to work in a team and having a formal qualification are also important. The ability to handle pressure, time management, and the ability to focus were stated as the least critical skills (Figure 4.21).

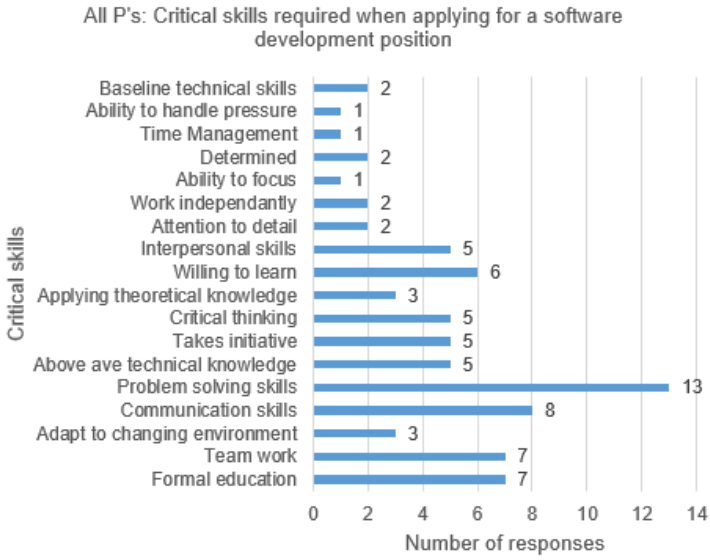


Figure 4.21: Critical skills required when applying for a software development position according to all participants

Finding 17: Problem solving ability is the most critical skill when graduates apply for a software development position

Finding 18: Communication skills second most critical skill graduates require when applying for a software development position.

Finding 19: Ability to handle pressure, time management and ability to focus are the least critical skills identified.

Finding 20: HR participants stated a formal education as critical when graduates apply for a software development position.

Finding 21: Yearlong or short-term certificate qualifications do not suffice when graduates apply for software development positions.

4.5.1.2 RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

This question was asked to understand what the screening process entails and how many steps and tools the graduate is exposed to.

Three of the eight companies that were part of the study had a 5-part screening process. All the companies use interviewing as a tool for the screening process.

Company 1 has a four-part screening process comprising of the initial interview to screen CVs against the job description and once a short list has been created, graduates are invited to a telephonic interview. If the telephonic interview is favourable, the graduate will receive an assessment. If the graduate passes the technical assessment, the graduate is invited to a panel interview and then a decision is made to either offer the graduate employment or not. Interviews and in-house coding tests are tools used during the screening process.

The screening process at Company 2 starts with a one-on-one conversation with the candidate to introduce the company, its values, technologies and the way of working. Since graduates have no formal work experience, an important part of the screening process is to see how the graduate has enabled self-learning. Graduates are then given a simple coding test. “it was just to see if you are able to think like a programmer, are you thinking critically are you thinking about not just the one positive happy parts solution or are you thinking about all the negative cases and all that stuff” (GP3, Appendix D). If graduates pass the coding test, they are invited for an interview to discuss their solution and determine culture fit. An employment decision is made after the final interview. Interviews and in-house coding tests are tools used during the screening process.

The screening process at Company 3 is lengthy five-part process for experienced developers and a short three-part process for graduates. Initial screening of CVs against job requirements is the first step and HRP6 mentioned that graduates are then interviewed by the hiring manager. Interviews can be done via zoom to accommodate Covid-19 protocols. A culture fit is important. “Less technical ability and more just finding out what type of person I am” (GP8, Appendix D). CVs are stored in Greenhouse and retrieved when needed. No test kits are given to the graduates as those are reserved for more experienced applicants. The graduate is then

invited to a second interview with the team lead and if the graduate is successful, an offer of employment is made.

Company 4 uses an external platform called Offerzen to attract or approach developers. The initial interview is done via this platform and once successful, a technical assessment is sent to the graduate. Graduates are then invited for an interview and their solution is discussed. SSP9 said that “before we just used to look at the technical assessments and be like, that’s great or not great, but now what I try to do as an ask [sic] a candidate to actually speak to us about the technical assessment” (Appendix A). If the graduate passes the technical assessment, a culture interview is done. The last interview is with the CTO before an employment decision is made.

The recruitment consultants screen CVs against job descriptions before sending the graduate details for the online assessment on Hacker Rank. If the graduate passes the test, graduates are invited to the first of three interviews. The first interview is theory based, the second interview is technical where the online assessment will be discussed, and the third interview is to determine culture fit. An employment decision is made after the completion of all three (3) interviews and references are contacted to verify the graduate’s CV.

At Company 6, the development manager screens the CVs against the job requirements and short lists the graduates. Graduates are then given a small in-house coding test and if successful, the graduate is invited for an on-site interview to discuss the solution. The graduate is invited to the culture interview if the on-site technical interview was successful and then an employment decision is made.

The graduate’s online portfolio and social presence are scrutinised before the graduate is invited for an interview, according to GP16. SSP15 stated the following: “So he might not be, he might be brilliant technically, but is what you’re doing with your personal life going to be an advantage to the business, to the team” (Appendix D). Once the first interview is successfully completed, the graduate is given a small test and if the graduate passes, the graduate is invited to a technical and cultural interview where HR is involved. An employment decision is made after the culture interview.

Initial screening is done by HR against job requirements at Company 8. Once a short list has been set up, the graduates are invited to a telephonic interview. HRP19 mentioned that testing is costly and testing graduates adds no value since graduates have no work experience. “But for the graduates, it doesn’t really serve much purpose for us. It hasn’t added much value to us. It’s mainly, we do validate their qualification” (HRP19, Appendix D). Graduates are then invited for a face-to-face interview where good attitude, interpersonal skills and a willingness

to learn among technical capabilities are assessed. “But, but beyond that, we don’t do technical assessments with our juniors. We might ask them more technical interest questions, but we don’t give them a technical test. We don’t think it’s the most accurate way of hiring graduates” (HRP19, Appendix D).

Finding 22: Initial screening of CVs against the job specification is the first step of the screening process.

Finding 23: All companies use interviews as part of the screening process.

Finding 24: Determining the culture fit of the graduate is an important part of the screening process.

Finding 25: In-house coding tests are used to assess technical ability.

Finding 26: Not all companies use technical tests as a means of assessing the graduate’s technical ability.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

This question was asked to identify the success indicators that approve a graduate for employment. The question was not posed to the GPs.

According to SSP2, the success indicators that approve a graduate for employment is an above average technical ability, having a good attitude and the willingness to learn and possessing behavioural competence. “To me, it’s more around behaviour. Can you be moulded” (SSP2, Appendix D). SSP9 agreed that an above average technical ability is a success indicator and added culture fit to the list of success indicators, but then stated that two other indicators are even more important – these indicators are how the graduate feels about creating an impact in the unemployment sector of SA and the graduate’s ability to use confidence and determination in order to create impactful software.

SSP15 identified the ability to apply theoretical knowledge as a success indicator. Without understanding the work and the ability to apply a skillset, the graduate will not be able to do the work at hand. A further success factor is expected remuneration and growth expectation within the company. Interpersonal skills, loyalty towards the company, teamwork and collaboration were also indicated as success indicators for employment.

HRP6 mentioned that graduates ideally should complete their studies prior to employment as their attention will be deterred from actual work to focus on their studies. Graduates should be

willing to learn and start from the bottom and work themselves into a higher role. Another success indicator, mentioned by SSP15, is that graduates need to be loyal to the company. “Because at the end of the day, what we want to do is after your intern, we would like to offer this person a permanent role, but it’s also dependent on if the person’s willing to stick it out” (HRP6, Appendix D).

SSP5 stated that each step of the screening process acts as a success factor. Each time the graduate passes a step, it is seen as a success factor until the final step is reached and the graduate is offered employment. SSP18 agreed that each successful progression through the screening process is a success indicator. HRP11 stated that success indicators depend on what the success measure is at the end of each screening section. A great emphasis is placed on the graduates’ coding assessment and ability to solve problems.

SSP14 stated that a balance of behavioural and technical competence in addition to having a good attitude is a success indicator that approves a graduate for employment. A good attitude is another success indicator, according to SSP18, and in addition, the ability to solve problems.

HRP1 and HRP19 mentioned that good communication skills are a success indicator for employment. HRP19 named the ability to focus and the determination to succeed as measures of success.

Finding 27: An above average technical ability and the ability to apply theoretical knowledge are success indicators for employment.

Finding 28: Having a good attitude and displaying behavioural and technical competence are also success indicators.

Finding 29: Progression at each step of the screening process is seen as success indicators until the graduates are approved for employment.

Finding 30: Culture fit and loyalty to the company are identified as success indicators.

Finding 31: Remuneration and growth expectation within the company are identified as success indicators.

4.5.1.3 RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

This question was asked to determine the participants' opinions of what the screening tests contribute towards streamline and aid the employment of a quality graduate.

i) Senior staff

Nineteen (19) of the 21 participants identified the greatest advantage of screening as an early indicator of the graduate's abilities and whether or not the graduate meets the minimum requirements as stated in the job specification (Figure 4.22).

All SSPs agreed that using screening is an advantage for an early indication of the graduate's technical abilities, as it ensures that the graduate meets the minimum requirements of the job. According to SSP5 and SSP18, screening also identifies the graduate's ability to solve problems. "Then the coding tests we'll screen out those that can, or can't problem solve" (SSP18, Appendix D).

SSP9 and SSP15 mentioned that an advantage of screening is the company's ability to assess whether the graduate will fit into the company culture. SSP15 added that it allows the company to mitigate risk, while SSP9 mentioned that it allows the company to mitigate the risk of going through the performance review process.

SSP5 and SSP9 stated that through screening, the company is able to vet whether the graduate has the interpersonal skills required for the job. According to SSP5, screening allows the company to gain insight into the graduate's character and behaviour. "We get to know each other as we speak: As we speak technical, as we speak non-technical, it's about getting to know the individual" (SSP5, Appendix D). Screening also allows the company to assess whether the graduate was honest in the completion of the coding assessment. It furthermore enables the company to not only assess the graduate's communication skills but also how well the graduate listened during the process.

An advantage perceived by all participants is that screening avoids time wastage. SSP5, SSP14 and SSP18 stated that screening avoids time wastage. "Because time is very important. We don't have a lot of time between the meetings and getting our objectives out" (SSP18 Appendix D).

ii) Human resources

HRPs (HRP1, HRP6, HRP7, HRP11, & HRP19) indicated that screening allows them to assess the graduate's technical ability and to ensure that the minimum requirements are met. HRP6

also stated that graduates could be at a higher level than anticipated and could therefore be employed in a higher position within the company.

> "Because of the test kit, we're able to see what this person does. This person is on a level of a mid, level position, maybe like a software analyst. We are able to then place this person on a higher level and then still have a junior level open for other applicants to come in" (HRP6, Appendix D).

HRP1 mentioned that screening allows for assessing behavioural competence as interviews are too subjective, so having various methods of assessment allows for comparing and aligning the subject and objective views. HRP1 argued that "it adds quality to the outcome" (Appendix D).

HRP1 and HRP11 agreed with HRP5, HRP14 and HRP18 that screening avoids time wastage. HRP11 mentioned that engineers' time is costly, so screening reduces the number of applications sent for the first interview since the recruitment team sieves through all the CVs received for the role.

iii) Graduates

GPs (GP3, GP4, GP8, GP10, GP12, GP13, GP17, & GP21) mentioned that screening is an early indicator of technical ability and filters out unsuitable candidates that do not meet the minimum requirements. GP10 and GP12 also mentioned that screening allows the company to assess the graduate's problem solving ability. GP12 stated: "There is some advantages in that they getting someone whom they've seen, write the code and they can solve problems" (Appendix D).

Ensuring that the graduate is a culture fit for the company is another advantage, according to GP8, GP16 and GP21. Companies are allowed to see whether the graduate really wants the job, is willing to learn, and will take initiative. GP16 mentioned: "I think it's, yeah, it's very important because it also helps on choosing the right people for the company because once you're able to screen to filter out a certain group, based on a certain mind-set, maybe that criteria is based on how the company wants" (Appendix D). GP21 added that screening allows the graduate to be placed under pressure allowing the company to assess how the graduate handle's pressure.

GP20 mentioned that an advantage of screening is the ability to assess the graduate's confidence in communicating. GP21 stated that screening avoids wasting time. "You don't want to waste anyone's time getting into an interview when you could have just screened someone and seen how they do and just let them go or get to know them better" (GP21, Appendix D).

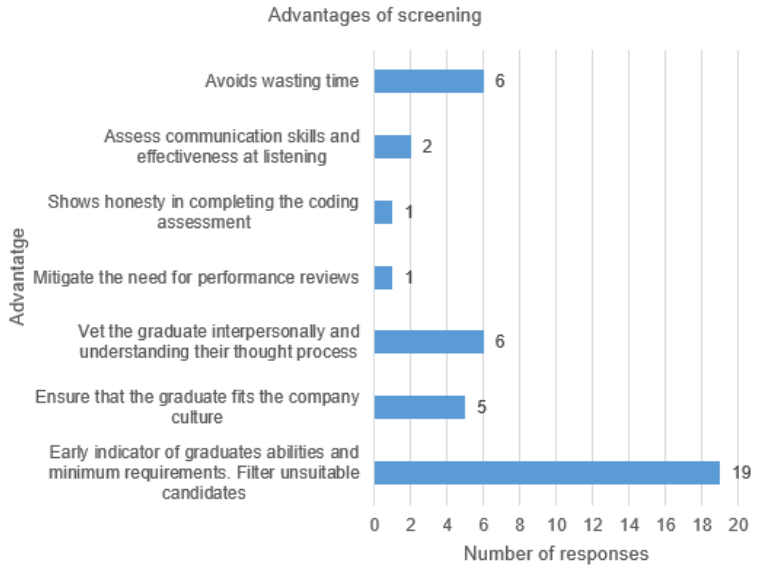


Figure 4.22: Advantages of screening

Finding 32: An advantage of screening is that it is an early indicator of the graduate's abilities and to assess whether graduates possess the minimum requirements of the job.

Finding 33: Screening avoids wasting unnecessary time during the application process.

Finding 34: Screening showcases the graduate's ability to problem solve which is a critical skill.

Finding 35: Screening indicates culture fit and whether the graduate is eager to fill the role they have applied for.

Finding 36: Screening vets the graduate's interpersonal skills and ability to handle pressure.

Finding 37: Communication skills are important, but screening allows the assessing of the graduates listening skills.

Finding 38: Screening allows for multiple decision points allowing for objective decision making.

IQ 1.3.2: What are the disadvantages of using these screening tests?

Disadvantages were asked to identify whether screening tests have a negative impact on the employment of graduates.

i) Senior staff

Disadvantages among SSPs varied. SSP2 and SSP15 stated that assessing a graduate's behavioural competence is challenging while screening. SSP15 argued that "we are dealing with people and soft things, or intangibles it's made difficult to be like, you could read someone completely wrong and you've got a problem down the line" (Appendix D). SSP5 mentioned that the screening process could be costly if the incorrect graduate progresses through the process.

> "That last bit, because it is the most expensive, the onsite interview, that typically takes an hour, sometimes longer. It is normally the last thing I do because of the amount of time it takes away and also, I will need a couple of colleagues to join me for that so it's not just my time, its other people's time, so that's always the last thing" (SSP5, Appendix D).

Graduates could feel intimidated by the technical testing, according to SSP9. "They might feel that a technical test has a high expectation in terms of turnaround time, how quickly they must do it. It might feel like a lot of pressure" (SSP9, Appendix D). SSP14 mentioned that the company cannot entirely be sure that the work delivered by the graduate has actually been completed by the graduate. SSP18 argued that HR screening is too generic, resulting in a missed opportunity.

ii) Human resources

HRP7 agreed with SSP5 that the screening process could be costly if the incorrect candidate is employed. HRP1 and HRP6 mentioned that graduates feel intimidated during the screening process. HRP1 noted that language could be a barrier for many graduates whose first language is not English. HRP6 said the following:

> "The interview processes can be quite stressful and, can also make people feel like they're little bit incompetent and the way that they may conduct themselves or the manner that they speak, or they come across as an introvert. Immediately, one would think like, oh no, this person's not going to get along with my team, but it's because we never gave this person enough time or an opportunity to really fully understand them" (Appendix D).

Companies cannot be 100% sure that the work delivered by the graduate was actually completed by the graduate, according to HRP6 and HRP19. HRP6 mentioned that an instance occurred where a graduate used somebody else to complete the test kit on their behalf: "We decided to present this person with a test kit and to do it within working hours. We saw that the two were not correlating and that's when the person also realised like, okay, I'm going to be caught in the act" (HRP6, Appendix D), which resulted in the graduate leaving the company.

HRP19 stated that the screening process is costly to companies since tests are expensive and time consuming. HRP19 furthermore agreed that technical tests can be cheated, thus giving a

false impression of skills. “So the accuracy of those for us from a graduate is just, it’s often not as valid” (HRP19, Appendix D).

iii) Graduates

Six of the ten graduate participants (GP3, GP4, GP10, GP12, GP13, & GP17) said screening tests ’cannot fully assess the graduate’s capabilities. GP4 mentioned that the tests are often too technically focused and do not identify the lack of soft skills. GP10 stated that the technical tests are unrealistic since graduates are not allowed to use external resources, thus making the test unrealistic since graduates are allowed to use external resources in the workplace.

> “I think to expect a graduate student to be able to do all of these things without access to the, third party resources is a bit unrealistic. I think it cuts down on talent that may have performed very well in the job, but doesn’t test well under those conditions” (GP10, Appendix D).

GP12 and GP13, both from Company 5, stated that the technical test has a time limit, which may risk losing good graduates because graduates might not be technically strong while being tested but have the aptitude to be a good fit for the company. GP12 explained:

> “If you are good enough to join the company, but you are not quick enough to solve those problems, that becomes an issue, so they lose good candidates and yeah, it’s also demoralizing when they cut it’s as well if they get back to them and say, oh, sorry, you didn’t make it” (Appendix D).

If the graduate does not do well in the screening test but is a good fit for the company, the graduate will be overlooked, as argued by GP17. “You might overlook someone who might actually be a perfect, a better fit for position, but maybe just doesn’t do well on the screening tests for some or other reason” (GP17, Appendix D). GP16 also mentioned that the screening tests could result in the company overlooking a graduate who is a good cultural fit.

GP10 stated that graduates could feel intimated and that the pressure experienced during the screening process is not a true reflection of the workplace. GP20 added to GP10’s statement by mentioning that tests are hard and place graduates under pressure. GP21 posited that graduates might not have been exposed to multiple development opportunities, causing them to perform poorly during the screening tests.

Dishonesty when completing the technical test is a disadvantage, according to GP3, GP8 and GP12. “You know there are ways to cheat on the assessment and so someone could cheat on the assessment and just talk a good game” (GP3, Appendix D).

GP3 and GP4 mentioned a further disadvantage of screening, namely that the process is not well implemented. GP3 said that interviews are subjective and the graduate could relate to one interviewer and not another. GP4 stated that screening limits the type of graduates, thus resulting in a graduate who might not be technically strong at the time of testing but could learn fairly quickly to become an asset to the development team.

> "You can get a very impressive, as soon as you meet them face to face, you get this sense ok this person is very capable of learning something like a language or a programming framework very fast but something like a screening process might take that person out of the scenario from the beginning so ja, you got to be careful" (GP4, Appendix D).

The disadvantage stated by the majority of the participants is that screening does not accurately assess the graduate's capabilities. Graduates also feel intimidated during the screening process (Figure 4.23). Companies cannot be sure that graduates are being honest when completing the technical test.

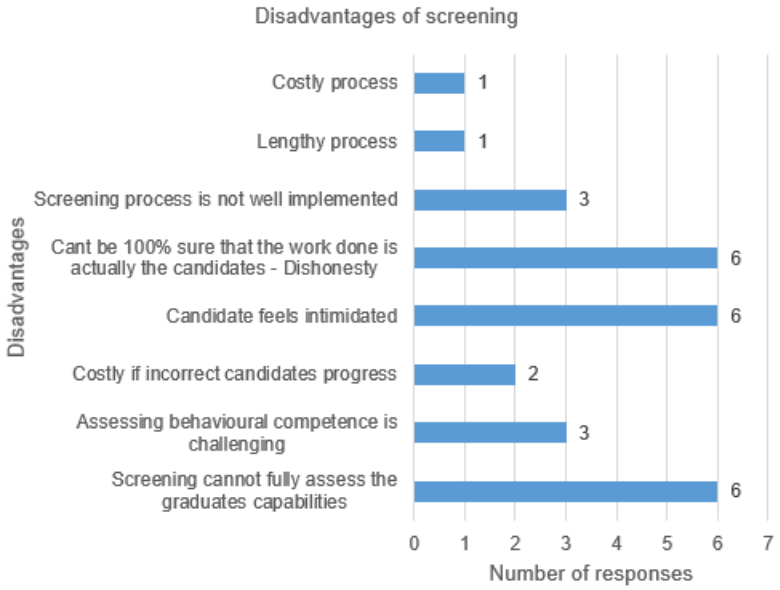


Figure 4.23: Disadvantages of screening

Finding 39: Screening cannot fully assess graduates' capabilities.

Finding 40: Graduates feel intimidated by the screening process.

Finding 41: Screening test cannot fully guarantee honesty of coding assessments done by graduates.

Finding 42: The screening process is costly whether or not a suitable graduate is employed.

Finding 43: Behavioural and interpersonal skills are challenging to assess during the screening process.

Finding 44: Tests are too technical and have time limits resulting in the risk of losing a suitable graduate.

Finding 45: Inability to use external resources while doing the technical test is not a true reflection of the workplace where external resources are used to solve problems.

Finding 46: Screening tests places undue pressure on graduates that is not a realistic representation of the workplace.

Finding 47: Screening tests are subjective and graduates can relate better with one interviewer than another.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

This question was asked to determine whether the results of the testing are beneficial in employing the suitable graduate. If not, it may result in employing the unsuitable graduate. This question was not posed to the GPs.

HRP1 and SSP2 mentioned that testing did not result in the employment of an unsuitable graduate, but post-employment, it resulted in graduates lacking interpersonal skills and displaying behavioural issues. SSP2 said that true behavioural competence is only seen once the graduate joins the company and is exposed to the daily processes within the company. “I had people that could do the job really well but had terrible behaviour, behavioural characteristics. That then takes away from your space as a manager because you should be spending your time elsewhere but now you are correcting bad behaviour” (Appendix D). It is hard to assess whether screening results in not employing the correct graduate, as stated by SSP2:

> “Well it’s quite difficult to assess that one when the person isn’t in the space. Like I said, in that process, I probably interviewed about 50 people but I do believe the 10 people that I did end up with were the correct ones. So I typically would not have selected them if I didn’t find them fit for purpose” (Appendix D).

SSP5 mentioned that screening ’is not the problem but that various organisational pressures could result in hiring the incorrect graduate. This is done by lowering various standards within the company. “You don’t get a lot of applications in but you are being pushed to hire someone then you end up hiring someone that wouldn’t typically suite your standards” (SSP5, Appendix

D). SSP5 further added that trusting your intuition is important since 'it is easier to upskill a graduate than to change the graduate's behaviour.

HRP6 said the screening process did result in the employment of an unsuitable graduate who cheated by falsely presenting work done by someone else and submitting it as their own. The company realised what had occurred and put the graduate through a performance review process, resulting in the graduate leaving the company. According to SSP15, it happened several times that an unsuitable graduate was employed, but for the most part, the correct person is employed. "More often than not you get the right person but there've been times I've been like, I made a mistake or we made a mistake" (SSP15, Appendix D).

SSP9 mentioned that there has not been an instance of employing the incorrect candidate. Graduates do not have much to show in terms of career, thereby making it hard to gauge their ability. "I think that if you look at an interview process that could be seen as a few steps, not too many steps, you might miss some things along the way, which inevitably will lead to you, placing a candidate who might not be as experienced as you'd hoped" (SSP9, Appendix D). HRP11 and SSP18 stated that screening has not resulted in the employment of an unsuitable graduate. SSP14 mentioned that screening is 90% accurate, resulting in a 10% chance of employing an unsuitable graduate.

Finding 48: Organisational pressures to employ a graduate sooner rather than later can result in the employment of the incorrect graduate and not the screening process.

Finding 49: Unsuitable graduate was employed by falsely presenting technical test as their own during the screening process.

Finding 50: The screening process is not the problem, but true behavioural competence is seen post-employment and is a challenge to rectify.

Finding 51: Screening has more often than not resulted in the correct graduate being employed by a company.

Finding 52: The possibility of not employing the suitable graduate is hard to assess if they have not worked in the company.

4.5.2 RQ2: How are tests articulated to successfully employ a quality graduate?

4.5.2.1 RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

This question was asked to identify which persons are instrumental in the creation of job descriptions within the company. This question was not posed to the GPs.

Job descriptions are created by the centre of expertise together with the role profiles that are created by the business unit, HR, and line managers for Company 1. Line managers then set up the HR business partner together with the assessment specialists to determine which behavioural assessments are to be done, according to HRP1. SSP2 of Company 2 said the development manager creates the job descriptions for the various roles.

Job descriptions are created by the hiring manager, the director, and senior engineers, according to SSP5 of Company 3, while HR is involved in improving the structure of the job descriptions. HRP6 and HRP7, also from Company 3, mentioned that the hiring manager and the Organisational Development Manager (ODM) create the job descriptions, where the hiring manager considers the needs of the team and the ODM looks at what is required for the team and business and creates the development path of the graduate.

SSP9 from Company 4 mentioned that job descriptions are created by the head of engineering and the CTO. The hiring manager and HR create job descriptions in Company 5. HR gives the guidelines for the role and grades (semi-skilled, skilled, professional), and ensures that the remuneration package is within the allocated budget for the role. The job description is then sent to the recruitment consultant who uses this to advertise for the role.

The head of engineering and HR create the job descriptions in Company 6, according to SSP14. HR constructs the initial job description and the head of engineering complete and sign off the job description since the graduate will be working in the engineering department.

In Company 7, the development team lead creates the job descriptions, according to HRP1. These descriptions are sent to HR and directors for sign off, since HR ensures that the remuneration package is within the budget for the role.

Job descriptions are created using Radford, which is a global job levelling tool used to standardise job descriptions in Company 8. These descriptions are then reviewed with the line managers, who will add requirements based on the role and technologies required. The nature of these roles change since technologies constantly change and therefore these job descriptions are regularly refined, according to HRP19.

Finding 53: Job descriptions are created by various senior staff members including team lead and senior developers.

Finding 54: Development managers, hiring managers, line managers and heads of engineering create job descriptions.

Finding 55: HR ensures that remuneration packages for the roles are within the allocated budget.

Finding 56: Job descriptions are created using outside tools or centers of excellence to standardise job descriptions before being sent to line managers for review.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

This question was asked to identify the persons involved in sourcing the characteristics used to determine fit for employment. This question was not posed to the GPs.

Characteristics are sourced from the company's value system, according to SSP2. This ensures that graduates are able to fit into the company's culture. HRP19 mentioned that characteristics are also sourced from the company values and that culture fit is vitally important. "We've got mission statements, a vision and values and they can come directly out of there" (HRP19, Appendix D). Company 3 uses a template sourced online that is then tweaked to accommodate the company's structure and values, according to SSP5. According to HRP6 and HRP7, also from Company 3, these characteristics are then loaded into a program called Greenhouse and used as a scorecard.

SSP9 mentioned that characteristics are usually based on their cultural requirements and personality traits required for the job. Taking initiative and being able to work in a team and collaborate are required to be successful. "It's more about wanting to work in an engineering team, but also being okay to work cross teams too" (SSP9, Appendix D). These characteristics extend beyond normal culture fit within an organisation since the vision is to be impactful for the greater good of employment within SA.

The development manager determines the characteristics required by the graduate and this is based largely on characteristics required in industry with experience in the workplace also adding to the required characteristics, according to SSP14. SSP15 mentioned that the development team lead in conjunction with the project managers and the rest of the team will determine the characteristics required for a software developer position. Research is done and a custom list of characteristics is created.

According to SSP18, senior management and team leads are involved in determining the characteristics of the graduates. These characteristics are generally sourced from experience in the roles and what Company 8 thinks would best suit the team. Teamwork, culture fit and willingness to learn are important since graduates would be working in a team. HRP11 mentioned that characteristics are based on the environment and previous employment successes.

At Company 1, the HR business partner in conjunction with the assessment team determines the behavioural characteristics of the role and the technical characteristics are determined by the line managers.

Finding 57: Previous successful appointments are used as a base for future placements.

Finding 58: Senior staff and team members determine characteristics of software developers.

Finding 59: Characteristics are sourced online and a custom template is created.

Finding 60: Characteristics are sourced from the values of the company.

Finding 61: HR is sometimes involved in determining characteristics.

Finding 62: Characteristics are sourced from cultural requirements within the company and personality traits of the job and within industry.

4.5.2.2 RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

This question was asked to understand the holistic process of setting up screening tests. This question was not posed to the GPs.

Software engineers are involved in setting up the screening tests, according to SSP2, HRP7, SSP14, and SSP18. SSP2 stated that software engineers are involved to ensure inclusivity but also to provide internal training for future leaders within the company and ensuring a mentoring mind-set for those who are new to the company. SSP1, SSP5, HRP6, HRP7, SSP9, HRP11, SSP14 and HRP19 mentioned that the senior staff (development managers, development team leads, head of engineering, head of development) decide on the tests that are to be completed by graduates during screening. HRP6 stated that tests are changed periodically since methodologies change over time. “It’s also good that we review it to ensure that it’s not outdated and that it does speak to somebody coming from a tech or college or

university" (HRP6, Appendix D). According to SSP9, HRP11 and HRP19, HR is also involved in setting up the screening tests. HRP11 mentioned that these tests are aligned to the environment and when the new role is added, a battery of tests is available to choose from.

Finding 63: Senior staff determine which tests are to be done by the graduates to ensure inclusivity of team members and grooming of future leaders.

Finding 64: R is involved in determining the tests done by graduates.

Q2.2.2: What is the role of HR in the screening process?

This question was asked to ascertain how and in what capacity HR fits into the screening process. This question was not posed to the GPs.

HR assesses the behavioural and cultural fit of the graduates during the screening process, according to SSP2, HRP6, SSP15 and HRP19. SSP2 added that HR's function is to assess the behavioural and cultural fit of the candidate, which is important for this part of the screening process because they also have a good understanding of how people can progress within the company and fit within the wider environment. HRP19 said that it is important for the process to be fair and correct, and this is the role of HR. "For graduates its normally one interview and we all attend the interview and we'll make sure that the interviews are conducted in a fair and realistic manner" (HRP19, Appendix D).

HR is also involved in ensuring that the salary expectations, job level, and hiring manager are correct for the job advertisement, according to SSP5, HRP6, HRP7, SSP15 and SSP18. HRP7 mentioned that HR does all the initial work of ensuring that the candidate meets the initial requirements of the job description, discussing salary requirements, notice period and possible start date and tries to establish why the candidate wants to join the company. However, according to HRP11, HR plays a supporting role and has minimum involvement in the screening process. HR is the key to initial screening, as indicated by SSP18. SSP5 mentioned that HR will be involved again at the end of the process to ensure that the contracts are set up and signed and that the graduate is inducted into the company.

Finding 65: HR is key to determining behavioural and culture fit of the graduate.

Finding 66: HR ensures that salary expectation, job level, hiring manager and all contracts are drawn up and correct for the job.

Finding 67: HR is key to the initial part of screening and once the graduate is employed, ensures that graduate is inducted into the company.

Finding 68: HR ensures that the screening process is fair.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

The testing of graduates is done to determine fit for employment. This question was asked to identify who decides which of those tests are to be done by the graduate. The question was not posed to the GPs.

According to SSP5, HRP6, HRP7, SSP9, SSP14, SSP15, SSP18 and HRP19, the senior staff decide on the tests that are to be done by the graduate. SSP5, SSP9, SSP14 and SSP15 mentioned that these tests are role-based, meaning that tests are setup depending on the role that is being recruited. HRP19 also added that a team runs the youth program at Company 8 and the decision of which tests, based on global best practices, is done by this team in consultation with senior staff and HR.

SSP2, SSP14 and SSP18 said their companies include the entire development team in the decision when choosing tests for graduates. SSP2 mentioned that 'it is important to include the entire team as part of ensuring inclusivity within the company. SSP18 said that the team lead creates the test but that the questionnaire posed to the graduate is a team effort. SSP18 stated that, "I came up with the concept and the requirements of it and the questionnaire we, the team leads came up together with over time" (Appendix D).

Finding 69: Senior staff decides on which tests are to be done by the graduates.

Finding 70: The development team is involved in setting up tests for graduates.

IQ 2.2.4: Are the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

This question was asked to determine whether testing was standard for all graduates. This question was not posed to the GPs.

Both SSP and HRPs unanimously mentioned that tests within their companies are standard for all graduates irrespective of qualifications and education institution. SSP9 said that tests are role-based and each role has its own set of screening tests irrespective of qualification and education institution. SSP9 posited that a qualification is not necessarily the deciding factor when it comes to deciding whether to employ a graduate or not, but that the academic sector is supported. "We don't discredit university degrees either, actually on the contrary we do favour academics; we do like it" (SSP9, Appendix D). HRP7 mentioned that the same test is given to all graduates so as to be fair during the screening process. HRP11 mentioned that

"it's been the same test, that we do, throughout the process, irrespective of what Institute you come from" (Appendix D).

SSP14 mentioned that tests are the same irrespective of qualification and education institution. Company 6 takes into account which institution the graduate is from, but it is not the deciding factor. SSP14 said the following:

> "As long as the candidate, obviously, has some sort of background of learning with what they're doing, that shows us to us as a business, that I have a solid foundation. It doesn't necessarily mean that if it's a university qualification or whether they went through an online academy, qualification, so we do take it into account, but it's not the end. It's not the very final decision that determines what kind of test we give accordingly" (Appendix D).

Finding 71: The same test is used for all graduates irrespective of their qualifications and education institution.

Finding 72: Tests are customised based on the graduate role and not qualifications and education institution.

4.5.2.3 RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

This question was asked to identify whether a process of evaluation is followed after a graduate has been employed.

According to HRP1, there is coaching and support for graduates. They are given feedback monthly on their outputs for the module they are learning. There are learning pathways designed for each graduate and within the monthly feedback sessions, graduates are given feedback.

For SSP2, GP3 and GP4, the process of evaluation involves a six-week programme. SSP2 indicated that graduates are given an induction project that allows them to mimic the internal processes. At each step, they have mentors assessing their progress and offering training where there are areas of improvement. Part of this process is ensuring that the graduates are technically competent but also that they are accountable and responsible for their actions. Behavioural competence is essential to this process of evaluation, since behavioural competence is only fully assessed once the graduate is employed. This process also assesses whether the graduate has the ability to adapt to change, pays attention to detail, thinks critically, can solve problems and has leadership qualities that can be honed. The process is

comprehensive but is crucial to finding whether the graduate can balance both technical and behavioural abilities. “It’s quite comprehensive but its specific enough to understand from a behavioural side and a functional side and technical capacity that you have that balance on both ends” (SSP2, Appendix D). GP3 mentioned that the induction project is a great help. GP3 stated that the “induction project was a lot of learning and upskilling us into the technologies that are maintained by the company so for example I didn’t know angular or .NET core which are two of the major frameworks used by the company” (Appendix D).

Company 3 uses a six-month probation period as part of their process of evaluation while ensuring monthly feedback is given to the graduates during those six months. SSP5 said that graduates learn about the technologies used at the company and are offered in-house training if required. Monthly check-ins are done to ensure that goals are reached and graduates receive more responsibility monthly, while a 360-evaluation is used to fully assess the graduates.

A one-on-one approach is taken to evaluate the graduate at Company 4. SSP9 said that evaluation after employment not only involves one-on-one check-ups but also determines whether the graduate goes over and beyond to improve the code base and the offering to the clients. According to SSP9 they “also assess the work that they’ve performed and the level of output that they’ve often performed. You also assess like the value creation that they’ve done within the company” (Appendix D).

Company 5 has an eight-week evaluation process whereby graduates are required to attend daily stand-ups to report on progress done the previous day and to discuss work to be complete for the current day. GP12 mentioned that there is no formal process of evaluation after employment but daily feedback through stand-up gives a clear indication whether a graduate is struggling or not. Each piece of work assigned to the graduate forms part of a bigger piece of work that ultimately has to be delivered at the end of the sprint. This showcased the graduate’s ability to work in a team and collaborate. Graduates are given a project to do, and at the end they have to present their work to the team.

Company 6, 7 and 8 use key performance indicators (KPIs) as a process of evaluation once a graduate is employed. These KPIs are used to measure the progress of the graduate, according to SSP14. “A set map of KPIs, to be able to make sure and be transparent with the graduate in terms of what they’ve been constantly assessed on, as they do their job” (SSP14, Appendix D). SSP15 mentioned that KPIs are set for each graduate, and evaluation is done on whether their skills are improving and whether they meet their deadlines. Monitoring is constant to ensure that there is movement and improvement in the skills of the graduate. SSP18 said that the process of evaluation is in the form of KPIs set by the graduate and hiring manager during the probation period. Meetings are held to discuss progress and performance.

Evaluation after employment focuses on soft and interpersonal skills, which enables the graduate to be outsourced to a client, according to HRP19. KPIs are also set for the graduate together with on-the-job training, coaching and mentorship. “Evaluation after employed focuses on soft and interpersonal skills which enables the graduate to be outsourced to a client. KPIs are also set for the graduate together with on-the-job training, coaching and mentorship” (HRP19, Appendix D).

Finding 73: An effective process of evaluation is an induction project given to the graduates before client work is introduced.

Finding 74: Probation periods with clear responsibilities are given to graduates and assessed monthly.

Finding 75: The process of evaluation involves going the extra mile to add value to the company.

Finding 76: KPIs are used as a process of evaluation together with on-the-job training.

Finding 77: Mentors are assigned to evaluate graduates after employment.

Finding 78: Behavioural competence is assessed during tasks given after employment.

Finding 79: Daily, bi-weekly or monthly check-ins are done to assess the graduate after employment.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

This question was asked to determine whether any post-employment success factors were identified for the graduate and whether there are any informal or formal training programmes set out for the graduate.

Outcomes are predetermined for each learning pathway of a graduate, and these outcomes are assessed to measure whether the work output has met the outcome or whether there is a need for further development, according to HRP1. “There are outcomes that are pre-determined and so they are no strict measures, as we know it in a performance contract, but they are reviews around whether it’s a strength or a development area” (HRP1, Appendix D). SSP2 mentioned that there are various indicators in place to measure success post-employment and whether areas of further development are identified. Company 2 ensures focused training to develop those areas of concern. Objectives are set and monitored to

evaluate progress over time. There is also an in-house trainer who works to develop specific programs for further development within the company. GP3 said that graduates constantly receive training on what is new in industry and on any skills that might be lacking within their skills set that is required by the company. GP3 stated the following: “The company is very supportive of people wanting to learn more and upskill themselves” (Appendix D). There is no formal training for graduates but rather in-house and on-the-job training, which, for GP4, is more valuable than formal training since on-the-job training is practical and sporadic. “We had sometimes where our managers or people, other people in technology would demo things or show us features of programs we haven’t looked at before and that would be more like informal and so there was never formal training” (GP4, Appendix D).

Company 3 uses the six-month probation period to measure success by setting objectives for the graduate to reach, according to SSP5. Graduates are also put on an acceleration programme designed by SSP5 to accelerate their knowledge within the company. HRP6 said there are no formal measures in place to measure success post-employment, but the check-ins are used to assess whether the graduate is deemed fit for employment after the probation period. There is formal compulsory training for graduates within Company 3, according to HRP7.

SSP9 and GP10 mentioned that there are one-on-one check-ins that allow Company 4 to measure success post-employment; no formal training is available, as on-the-job training and a quarterly review system are used to rate the graduate’s performance. Goals are then set for the next quarter and meetings are held every second week for feedback, said GP10.

Sprints are used to measure success post-employment, according to GP12 and GP13, since tasks are assigned during sprints and feedback is given daily during stand-up. Each sprint lasts for two weeks and graduates are measured to see whether they have completed their assigned tasks. Training at Company 5 is done online, where graduates have access to an online training academy called Udemy that is available at all times. Another form of training is hack days where each person brings a topic that will benefit the team or product and is allowed to explore or research the topic. The person then reports back to the team and a decision is made to implement or not, according to GP13.

SSP14 mentioned that KPIs are used to measure success and that graduates are given the necessary tools and training required to be successful in the role. Graduates receive in-house training over and above their specific role within the company.

SSP15 and GP16 mentioned that there are no formal indicators to measure success and no formal training is available at Company 7. GP17 indicated that task completion is a measure

of success and re-iterated that Company 7 has no formal training. “There’s no outlined, learning paths for you designed to upscale you” (Appendix D). SSP15 mentioned that the company is looking to implement a measure of success for graduates.

There are no formal indicators for graduates other than completing their tasks on time, according to GP20, but online training or training on-the-job by managers or senior developers is readily available. GP21 mentioned that indicators are measured within the agile process of two-week sprints. SSP18 indicated that “in the end, it’s up to the developer to actually compete their work over that task” (Appendix D). SSP18 said that in-house training is offered whereby the developer can approach others or do an online course via Plural Sight. Graduates are encouraged to learn and take initiative in their development. SSP18 argued that “they can upskill themselves as long as it’s within the alignment of the company and what we actually working with” (Appendix D).

Finding 80: Predefined outcomes and objectives are indicators to measure success post-employment.

Finding 81: KPIs are used to measure success post-employment.

Finding 82: In-house training is offered to develop skills that are lacking and company specific skills.

Finding 83: On-the-job training is valuable because it is practical and sporadic.

Finding 84: Graduates have access to online training academies for development or training of skills.

Finding 85: No measures of success or training plans are set out for graduates other than task completion.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

This question was asked to understand what process is followed, if any, should the graduate not be a fit for the company. This question was not posed to the GPs.

HRP1 mentioned that there is a process involved before a graduate is deemed unfit for a role. The graduate has various outcomes that need to be reached. If those outcomes are not favourable, the graduate receives further training to develop the skill that is lacking. If after training the graduate is still unable to do the required job, Company 1 will seek to move the

graduate into a different role. If this 'is not a viable option, Company 1 will proceed with the formal incapacity process.

If a graduate 'does not meet deadlines and is found to be incompetent after training has been given, Company 2 will start a poor performance process, as mentioned by SSP2. The graduate may have a technical or behavioural incompetence, or both, which will result in commencing the process. In one instance, the developer was technically strong but lacked soft skills such as accountability and responsibility, which resulted in initiating the poor performance process. Graduates are put through a performance management process if they are not deemed a quality graduate, according to SSP15. "So there is a performance process but also a personal process you have to follow" (SSP15, Appendix D).

If graduates are not deemed to meet the criteria after being employed, Company 3 will put the graduates through an improvement plan with clear milestones and targets (SSP5). Each week, the graduate will be measured and if there is no clear level of improvement, the graduate will not exceed the six-month probation period. HRP7 mentioned that "the manager would obviously have to prove that they did everything that they could to set the person up for success, if they couldn't do the work that we needed them to do then obviously you would look at an exit process" (Appendix D).

SSP9 mentioned factors that could make a graduate unsuccessful post-employment, i.e., an inexperience issue, lack of discipline that is required for the job, or perhaps laziness. This is gauged by the development manager and once the reason is established, the correct measures are taken. One of the measures is a performance review process where HR is involved. This is critical since employing the incorrect candidate is an expensive process in terms of the time required for the performance review process.

Graduates who are not deemed quality graduates are handed over to HR, according to HRP11 and SSP18. SSP14 stated that graduates are given the opportunity to improve their skill but there are indicators in place which will result in the candidate staying or leaving the company. HRP19 mentioned that the graduate's contract will not be renewed after the 12-month graduate program period if the graduate is not deemed a quality graduate.

Finding 86: Graduates are placed on performance improvement plans, which involve training, re-assessment to rectify the skills that are lacking.

Finding 87: Graduates who are not deemed quality graduates and have not been able to perform during the performance improvement process are put through a poor performance process.

Finding 88: Performance review process is costly.

4.5.3 List of findings

Findings were derived from the 21 interviews that were divided into three groups, namely SS, HR and graduates. In total, 88 findings emerged from the analysed interview data. These findings are linked to the research questions, research sub-questions and interview questions, as shown in Table 4.3.

Table 4.3: The 88 findings with links to the research questions, research sub-questions and IQs

RQ	RSQ	IQ	F#	Details
1	1.1	1.1.1	1	The skill most lacking is interpersonal skills.
1	1.1	1.1.1	2	The second most lacking skill is the ability to apply theoretical knowledge.
1	1.1	1.1.1	3	Teamwork and collaboration and problem solving skills were combined as the third most lacking skill.
1	1.1	1.1.1	4	Communication skills and behavioural competence have been identified as skills lacking when graduates enter the workplace.
1	1.1	1.1.1	5	The lack of work experience was identified as the most pressing issue when graduates enter the workplace.
1	1.1	1.1.1	6	There is a gap between what graduates learn at an education institution and what is expected in the workplace.
1	1.1	1.1.1	7	Critical thinking skills, time management, confidence, leadership skills and the ability to adapt to change are least lacking.
1	1.1	1.1.2	8	A quality graduate takes initiative, is willing to learn and has the ability to solve problems.
1	1.1	1.1.2	9	A quality graduate has interpersonal skills and can work in a team and collaborate.
1	1.1	1.1.2	10	A quality graduate does not have to have work experience even though it is lacking when graduates enter the workplace.
1	1.1	1.1.2	11	Communication skills and the ability to apply theoretical knowledge is indicative of a quality graduate.
1	1.1	1.1.2	12	Work experience does not have to be experience in the graduate's field of study.
1	1.1	1.1.2	13	Confidence and humility are soft skills other than interpersonal and communication skills stated as attributes of a quality graduate.
1	1.1	1.1.3	14	The most important characteristic for employability is a willingness to learn.
1	1.1	1.1.3	15	Taking initiative is the second most important characteristic for employability.
1	1.1	1.1.3	16	Humility, determination and being able to adapt to change are identified as key characteristics for employment followed by teamwork and collaboration and having a good attitude.
1	1.1	1.1.4	17	Problem solving ability is the most critical skill when graduates apply for a software development position.

RQ	RSQ	IQ	F#	Details
1	1.1	1.1.4	18	Communication skills second most critical skill graduates require when applying for a software development position.
1	1.1	1.1.4	19	Ability to handle pressure, time management and ability to focus are the least critical skills identified.
1	1.1	1.1.4	20	HR participants stated a formal education as critical when graduates apply for a software development position.
1	1.1	1.1.4	21	Yearlong or short-term certificate qualifications do not suffice when graduates apply for software development positions.
1	1.2	1.2.1	22	Initial screening of CVs against the job specification is the first step of the screening process.
1	1.2	1.2.1	23	All companies use interviews as part of the screening process.
1	1.2	1.2.1	24	Determining the culture fit of the graduate is an important part of the screening process.
1	1.2	1.2.1	25	In-house coding tests are used to assessing technical ability.
1	1.2	1.2.1	26	Not all companies use technical tests as a means of assessing the graduate's technical ability.
1	1.2	1.2.2	27	An above average technical ability and the ability to apply theoretical knowledge are success indicators for employment.
1	1.2	1.2.2	28	Having a good attitude and displaying behavioural and technical competence are also success indicators.
1	1.2	1.2.2	29	Progression at each step of the screening process is seen as success indicators until the graduates are approved for employment.
1	1.2	1.2.2	30	Culture fit and loyalty to the company are identified as success indicators.
1	1.2	1.2.2	31	Remuneration and growth expectation within the company are identified as success indicators.
1	1.3	1.3.1	32	An advantage of screening is that it is an early indicator of the graduate's abilities and to assessing whether graduates possess the minimum requirements of the job.
1	1.3	1.3.1	33	Screening avoids wasting unnecessary time during the application process.
1	1.3	1.3.1	34	Screening showcases the graduate's ability to problem solve which is a critical skill.
1	1.3	1.3.1	35	Screening indicates culture fit and whether the graduate is eager to fill the role they have applied for.
1	1.3	1.3.1	36	Screening vets the graduate's interpersonal skills and ability to handle pressure.
1	1.3	1.3.1	37	Communication skills are important, but screening allows the assessing of the graduates listening skills.
1	1.3	1.3.1	38	Screening allows for multiple decision points allowing for objective decision making.
1	1.3	1.3.2	39	Screening cannot fully assess graduate's capabilities.
1	1.3	1.3.2	40	Graduates feel intimidated by the screening process.

RQ	RSQ	IQ	F#	Details
1	1.3	1.3.2	41	Screening test cannot fully guarantee honesty of coding assessments done by graduates.
1	1.3	1.3.2	42	The screening process is costly whether or not a suitable graduate is employed.
1	1.3	1.3.2	43	Behavioural and interpersonal skills are challenging to assessing during the screening process.
1	1.3	1.3.2	44	Tests are too technical and have time limits resulting in the risk of losing a suitable graduate.
1	1.3	1.3.2	45	Inability to use external resources while doing the technical test is not a true reflection of the workplace where external resources are used to solve problems.
1	1.3	1.3.2	46	Screening tests places undue pressure on graduates that is not a realistic representation of the workplace.
1	1.3	1.3.2	47	Screening tests are subjective and graduates can relate better with one interviewer than another.
1	1.3	1.3.3	48	Organisational pressures to employ a graduate sooner rather than later can result in the employment of the incorrect graduate and not the screening process.
1	1.3	1.3.3	49	Unsuitable graduate was employed by falsely presenting technical test as their own during the screening process.
1	1.3	1.3.3	50	The screening process is not the problem, but true behavioural competence is seen post-employment and is a challenge to rectify.
1	1.3	1.3.3	51	Screening has more often than not resulted in the correct graduate being employed by a company.
1	1.3	1.3.3	52	The possibility of not employing the suitable graduate is hard to assessing if they have not worked in the company.
2	2.1	2.1.1	53	Job descriptions are created by various senior staff members including team lead and senior developers.
2	2.1	2.1.1	54	Development managers, hiring managers, line managers and heads of engineering create job descriptions.
2	2.1	2.1.1	55	HR ensures that remuneration packages for the roles are within the allocated budget.
2	2.1	2.1.1	56	Job descriptions are created using outside tools or centres of excellence to standardise job descriptions before being sent to line managers for review.
2	2.1	2.1.2	57	Previous characteristics based on successful appointments are used as a base for future placements.
2	2.1	2.1.2	58	Senior staff and team members determine characteristics of software developers.
2	2.1	2.1.2	59	Characteristics are sourced online and a custom template is created.
2	2.1	2.1.2	60	Characteristics are sourced from the values of the company.
2	2.1	2.1.2	61	HR is sometimes involved in determining characteristics.
2	2.1	2.1.2	62	Characteristics are sourced from cultural requirements within the company and personality traits of the job and within industry.

RQ	RSQ	IQ	F#	Details
2	2.2	2.2.1	63	Senior staff determine which tests are to be done by the graduates to ensure inclusivity of team members and grooming of future leaders.
2	2.2	2.2.1	64	HR is involved in determining the tests done by graduates.
2	2.2	2.2.2	65	HR is key to determining behavioural and culture fit of the graduate.
2	2.2	2.2.2	66	HR ensures that salary expectation, job level, hiring manager and all contracts are drawn up and correct for the job.
2	2.2	2.2.2	67	HR is key to the initial part of screening and once the graduate is employed, ensures that graduate is inducted into the company.
2	2.2	2.2.2	68	HR ensures that the screening process is fair.
2	2.2	2.2.3	69	Senior staff decides on which tests are to be done by the graduates.
2	2.2	2.2.3	70	The development team is involved in setting up tests for graduates.
2	2.2	2.2.4	71	The same test is used for all graduates irrespective of their qualifications and education institution.
2	2.2	2.2.4	72	Tests are customised based on the graduate role and not qualifications and education institution.
2	2.3	2.3.1	73	An effective process of evaluation is an induction project given to the graduates before client work is introduced.
2	2.3	2.3.1	74	Probation periods with clear responsibilities are given to graduates and assessed monthly.
2	2.3	2.3.1	75	The process of evaluation involves going the extra mile to add value to the company.
2	2.3	2.3.1	76	KPIs are used as a process of evaluation together with on-the-job training.
2	2.3	2.3.1	77	Mentors are assigned to evaluate graduates after employment.
2	2.3	2.3.1	78	Behavioural competence is assessed during tasks given after employment.
2	2.3	2.3.1	79	Daily, bi-weekly or monthly check-ins are done to assessing the graduate after employment.
2	2.3	2.3.2	80	Predefined outcomes and objectives are indicators to measure success post-employment.
2	2.3	2.3.2	81	KPIs are used to measure success post-employment.
2	2.3	2.3.2	82	In-house training is offered to develop skills that are lacking and company specific skills.
2	2.3	2.3.2	83	On-the-job training is valuable because it is practical and sporadic.
2	2.3	2.3.2	84	Graduates have access to online training academies for development or training of skills.
2	2.3	2.3.2	85	No measures of success or training plans are set out for graduates other than task completion.
2	2.3	2.3.3	86	Graduates are placed on performance improvement plans, which involve training, re-assessment to rectify the skills that are lacking.
2	2.3	2.3.3	87	Graduates who are not deemed quality graduates and have not been able to perform during the performance improvement process are put through a poor performance process.

RQ	RSQ	IQ	F#	Details
2	2.3	2.3.3	88	The performance review process is costly.

*RQ-research question; RSQ-sub research question; IQ-interview question; F-finding

From the 88 findings, 26 categories were determined (Table 4.4).

Table 4.4: Finding numbers, research questions, research sub-questions, codes and categories

Finding No.	RQs	SRQs	Code	Categories
1, 2, 3, 4, 5, 6, 7, 9, 11, 17, 18, 27, 36, 43	1	1.1; 1.2; 1.3	Skills lacking	Skills lacking when graduates enter the workplace
1, 3, 8, 14, 15, 16, 36, 41, 57, 58, 59, 60, 61, 62	1, 2	1.1; 1.3; 2.1	Characteristics of employment	Characteristics identified by industry as necessary for employment
1, 2, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 37	1	1.1; 1.3	Quality graduate	Quality graduate
4, 17, 18, 19, 20, 21, 34	1	1.1; 1.3	Critical skills	Critical skills required for employment
5, 10, 12	1	1.1	Work experience	Work experience
6, 21	1	1.1	Inadequate education	Gaps in the education of graduates
13, 19, 24, 28, 30, 35, 36, 37, 39, 40, 43, 50, 63, 64, 65, 74, 78, 86	1, 2	1.1; 1.2; 1.3; 2.2; 2.3	Assessing soft skills	Soft skills preferred by industry for graduates
20, 31, 55, 64, 65, 66, 67, 68	1, 2	1.1; 1.2; 2.1; 2.2	HR involvement	HR involvement in the graduates' journey from screening to induction
22, 23, 24, 25, 26, 29, 30, 43, 50, 52, 67, 71, 72	1, 2	1.1; 1.2; 1.3; 2.2	Screening process	Screening process
25, 26, 28, 32, 34, 39, 44, 45, 63, 64, 69, 70, 71, 72, 73, 74, 79, 86	1, 2	1.2; 1.3; 2.2; 2.3	Assessing technical ability	Technical ability of graduates when entering the workplace
27, 28, 29, 30, 31	1	1.2	Success indicators for employment	Success indicators during the screening process
32, 33, 34, 35, 36, 37, 38, 51	1	1.3	Advantage of screening	Advantage of screening
38, 60, 62, 70	1, 2	1.3; 2.1; 2.2	Company decision	Involvement of team members and company values in choosing graduates
39, 40, 41, 42, 44, 45, 46, 47, 88	1, 2	1.3; 2.3	Disadvantage of screening	Disadvantage of screening
40, 44, 45, 46, 47, 48	1	1.3	Workplace pressure	Workplace pressure

Finding No.	RQs	SRQs	Code	Categories
41, 49	1	1.3	Dishonesty during screening	Dishonesty during screening
50, 73, 74, 76, 80, 81, 82, 83, 84, 85	1	1.3; 2.2; 2.3	Post-employment measures of success	Post-employment measures of success
42, 44, 48, 49	1	1.3	Unsuitable graduate	Unsuitable graduate employed
42, 44, 51, 52	1	1.3	Suitable graduate	Suitable graduate employed
53, 54, 56	1, 2	1.3; 2.1	Job description creation	Job description creation
53, 54, 56, 58, 63, 69	1, 2	1.3; 2.1; 2.2	Senior staff involvement	Senior staff involvement in recruiting graduates
71, 72	2	2.2	Standard testing	Standard testing during screening process
73, 74, 75, 76, 77, 78, 79, 80, 81, 83, 84, 85	2	2.2; 2.3	Process of evaluation	Process of evaluation after successful employment
76, 77, 78, 82, 86, 87	2	2.3	Training and development	Training and development post-employment
86, 87, 88	2	2.3	Performance review	Performance process if graduate is unsuitable

*RQ-research question; RSQ-sub research question; IQ-interview question; F-finding

4.6 Theme development

Three (3) themes have been identified from the 26 categories listed in Table 4.4. These themes are shown in Table 4.5, and are linked to the research questions, research sub-questions, interview questions and findings.

Table 4.5: Finding numbers, themes, interview questions, research sub-questions and research questions

Finding No.	Categories	Themes	IQs	RSQ	RQ
1, 2, 3, 4, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 34, 36, 37, 41, 57, 58, 59, 60, 61, 62	Characteristics identified by industry as necessary for employment Quality graduate	The ideal software development graduate	1.1.1; 1.1.2; 1.1.3; 1.1.4; 1.3.1; 1.3.2; 2.1.2	1.1; 1.3; 2.1	1, 2
1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37,	Skills lacking when graduates enter the workplace Critical skills required for employment Gaps in the education of graduates Work experience Soft skills preferred by industry for graduates HR involvement in the graduates	Testing of graduates for employment	1.1.1; 1.1.2; 1.1.4; 1.2.1; 1.2.2; 1.3.1; 1.3.2; 1.3.3; 2.1.1; 2.1.2;	1.1; 1.2; 1.3; 2.1; 2.2; 2.3	1, 2

Finding No.	Categories	Themes	IQs	RSQ	RQ
38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 60, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 78, 79, 86, 88	Journey from screening to induction Screening process Technical ability of graduates when entering the workplace Success indicators during the screening process Advantage of screening Involvement of team members and company values in choosing graduates Disadvantage of screening Workplace pressure Dishonesty during screening Unsuitable graduate employed Suitable graduate employed Job description creation Senior staff involvement in recruiting graduates Standard testing during screening process		2.2.1; 2.2.2; 2.3.1; 2.3.3		
27, 28, 29, 30, 31, 50, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88	Post-employment measures of success Process of evaluation after successful employment Training and development post-employment Performance process if graduate is unsuitable	Post-employment evaluation, training and development for graduates	1.2.2; 1.3.3; 2.3.1; 2.3.2; 2.3.3	1.2; 1.3; 2.3	1, 2

*IQ – interview questions; RSQ- research sub-questions; RQ – research questions

4.7 Summary

The collection of data was both challenging and rewarding. Amidst the covid-19 pandemic, 21 participants from eight (8) companies from Cape Town, South Africa agreed to participate in this study. Interviews were conducted via zoom and transcribed to ensure the analysis of the data which was undertaken to deduce 88 findings for the purpose of answering the research questions posed in this study.

All participants gave written consent (Appendix D) and during the interview, gave verbal consent. These responses were summarised, re-read numerous times so as to identify codes and then codes were linked to keyword concepts used in this study. The 88 findings were then categorised into three (3) themes. This chapter included all findings as collected during the interviews from the 21 participants.

The research questions, findings and emergent themes will be discussed in detail in relation to the existing literature in Chapter 5.

CHAPTER 5: DISCUSSION OF THE FINDINGS

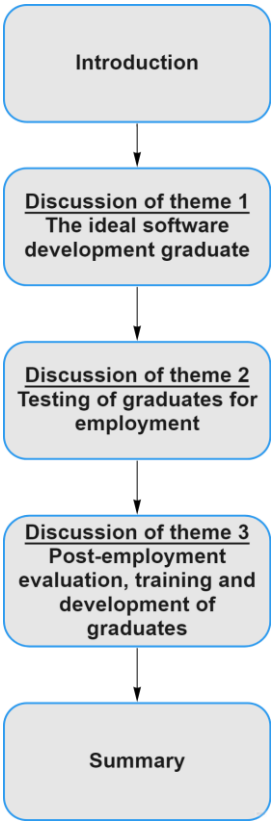


Figure 5.1: Layout of Chapter 5

5.1 Introduction

There is a gap between the expectations of the employers and the level of education the graduates receive from higher education institutions. The collaboration between university and industry is essential and more focus should be given to enhancing the curriculum. This is required for the successful entry of graduates into the workplace. Skills required versus skills obtained can be minimised by industry playing an active role to encourage communication between industry and education. The relationship between industry and universities is vital to successful graduate employability since an issue facing graduates entering the workplace is a lack of knowledge not thoroughly covered at university (Cvetkovic et al., 2019). The lack of communication between industry and education institutions has been a recurring topic. There is evidence that students are not prepared for industry and that there should be closer communication between industry and universities (Sarkar et al., 2020; Graham et al., 2019; Chillas et al., 2015). Graduates' ability to apply their learnt skills is lacking which is problematic for future graduates (Baird & Parayitam, 2019). Research show that companies are dissatisfied with the quality of education graduates receive for core competencies and skills (Bilan et al., 2020; Khampirat et al., 2019; Baird & Parayitam, 2019; Garousi et al., 2019; Kruhlyk, 2017; Wolff & Booth, 2017).

Students require higher levels of personal, social and emotional skills than they possess and are consistent with the results obtain for professional competencies that show that employers demand more skills than those acquire by graduates (Pertegal-Felices et al., 2014). Healy et al. (2021) posit that the employability of graduates is complex and involves various aspects that can only be achieved if they have industry and academia to support it. Companies can only fully gauge interpersonal skills after the graduate has started working making the screening process inadequate to fully assess this capability prior to employment.

Before graduates enter the workplace, they are put through a screening process. Companies choose what this process is and the number of steps the process holds. The screening process according to the participants in this study is used to determine:

i) Technical competence
ii) Behavioural competence
iii) Cultural fit

Graduates seldom tick all the criteria required for the position they have applied for which leads to companies offering training in the form of online courses, mentorship programmes or induction projects. Core competencies and critical skills such as thinking analytically, technological ability, strategic thinking, problem solving, communication and collaboration is screened by companies during interviews but the skill to participate in an interview is not imparted on the graduate (Baird & Parayitam, 2019). The concepts of competencies and skills are a golden thread throughout the literature, findings and the discussion of the thesis.

In this discussion, understanding what a quality graduate is, how companies derive it, how they test the graduate, and ultimately how they develop graduates post-employment are explored. The themes that have been identified in relation to the RQs and RSQs are discussed and linked to existing literature. The following themes are discussed: i) the ideal software development graduate, ii) testing of graduates for employment, iii) post-employment evaluation, training and development of graduates.

5.2 Theme 1: The ideal software development graduate

5.2.1 Introduction

According to the participants and companies in this study, the ideal software development graduate is a combination of characteristics, technical and interpersonal skills. The graduate needs a balance between technical and soft skills, but this balance is not always achieved and companies are left to further develop graduates. Determining what an ideal graduate is according to specific company requirements is the key to understanding the needs of companies when employing graduates. This is done by identifying a quality graduate based on the needs of the companies then by followed with a screening test.

This theme strives to identify the ideal software graduate by answering RQ1, RSQ 1.1, RSQ 1.2, RSQ 1.3, RQ2, and RSQ 2.1.

5.2.2 Identifying the ideal software development graduate

A quality graduate is defined as a graduate who has the competences set out by higher institutions that meets the requirements of the workplace (Chapter 2, section 2.3). Companies use their culture, vision, previous placements and industry standards to identify various characteristics for an ideal software development graduate (for this discussion the ideal software development graduate is also referred to as an ideal/quality graduate). According to Hora (2020:307), a culture fit "encompasses measuring personality, attitude and various cognitive competencies against existing staff members and industry standards". SSP5 mentioned that Company 3 sources a template online and tweaks it to accommodate their structure and values when identifying required characteristics for the job and potential employee. Characteristics are sourced from the values of the company, according to HRP19: "We've got mission statements, a vision and values and they can come directly out of there" (Appendix D).

Suleman and Costa Laranjeiro (2018) mention that theory, programming languages and mathematics are acquired by graduates during their studies, but some knowledge and skills are cultivated when graduates enter the workplace. This can happen when a company requires specific skills for example a programming language that falls outside of the universities curriculum. These specific and other skills create gaps that are ultimately result in training by companies (Suleman & Costa Laranjeiro, 2018). Assuring quality of learning in the workplace is challenging since students' outcomes vary based on interactions with other employees and various factors within the industry (Smith et al., 2019).

5.2.2.1 Skills of an ideal graduate

Understanding which skills companies are looking for in the ideal graduate is key to understanding how companies ultimately define what an ideal (quality) graduate is. For the ideal candidate a mixture of technical and soft skills are needed. Unfortunately, there is a lack of this mixture in graduates for the workplace. Graduates are required to possess the ability to solve problems when entering the workplace. This, together with the ability to communicate, is seen as the most critical skills when graduates complete their studies. Participants identified critical skills that the ideal graduates should have when entering the workplace as ranging from having a problem-solving ability to being able to handle pressure. SSP18 stated that graduates should possess the ability to solve problems and take initiative to complete tasks: "Definitely problem-solving and being able to innovate a solution around the problem" (Appendix D). SSP2 supported this opinion and mentioned that graduates should think logically and be willing

to learn: “At a graduate level I would say that is it, critical thinking and logical, ability to think logically, ability to have that continuous learning and improvement process” (Appendix D).

Sultana and Reed (2018) also mention that universities should focus on critical thinking skills and mentioned that experts in industry recommend students to focus on programming, software engineering process and soft skills like problem-solving, critical thinking and teamwork in computer science degrees. They believe these are the most important for workplace readiness. HRP11 mentioned that, “we generally look at people with like good computer science and mathematics background, and then strong problem-solving skills, strong communication skills, and then strong understanding of object-oriented programming languages” (Appendix D).

More emphasis is placed on the theory, technical computer science topics and maths instead of project management, communication skills and professionalism (Garousi et al., 2019). The soft skill most lacking across all three groups was interpersonal skills. The literature review (Chapter 2, section 2.2) indicates that more recently project management, communication skills, and professionalism have become increasingly important to be an ideal graduate given the interaction that the new agile software development has as opposed to the older waterfall methodologies. This is supported by senior staff, who opined that graduates lack interpersonal and behavioural skills. Graduates’ self-confidence and self-perception play a role in their ability to be employed (Magagula et al., 2020). According to Shah, Grebennikov and Nair (2015), the most important skills when employing the ideal graduate are communication, teamwork, integrity, intellectual ability and confidence. Osmani, Weerakkody and Hindi (2017) agree and mention that communication is an important skill for graduate employability. Roepen (2017) mentions that self-management seems to be the most important soft skill because of the need to impress positively, being scrutinised by others in the workplace and the sudden reality of responsibility and accountability. Skills that are important are professional maturity, soft skills, problem-solving, continuous learning, communication, time management, teamwork, and attention to detail, among others (Chhinzer & Russo, 2018). According to Damoah et al. (2021), employers rate knowledge, leadership, technical management, the ability to work in teams, and mathematical and interpersonal skills high when graduates enter the workplace.

For the ideal graduate, employers found the following skills as highly important: i) analytical skills, ii) attention to detail, iii) behaviour, iv) commercial skills, v) awareness, vi) communication, vii) technical ability, viii) confidence, ix) continuous learning, x) critical thinking, xi) decision making, xii) handling pressure, xiii) intellectual ability, xiii) integrity, xiv) interpersonal skills, xv) take initiative, xvi) mathematics, xvii) passion, xviii) problem-solving skills, xix) professionalism, xx) project management, xxi) responsibility, xxii) self-management,

xxiii) teamwork, xxiv) time management, xxv) work experience, xxvi) writing skills, xxvii) determination, and xxviii) the ability to adapt.

5.2.2.2 Characteristics of an ideal graduate

Before identifying the characteristics an ideal graduate requires when entering the workplace, it is important to further unpack what industry defines as an ideal (quality) graduate.

i) Willingness to learn

It is clear that the graduates' ability to take initiative and willingness to learn are important across the participants in defining a quality graduate. This could be due to team members having their own deliverables and therefore graduates are required to fend for themselves and ensure self-learning. SSP2 mentioned that graduates need to learn how to manage their time since time is often managed in a team setting where various components are done at a specific time to fit into the bigger picture. Learning is not sufficient at university level and graduates are encouraged to have an attitude of continuous learning so as to constantly groom their skills they have acquired (Sinha et al., 2020). An ideal graduate is self-taught and determined to excel in their chosen career. The graduate is willing to learn and go beyond their studies, according to SSP5 who said: "You need to code every day and you don't need a job for that, you just need a computer and you don't even need a team because there are a lot of open-source projects out there" (Appendix D). It is this eagerness to learn and understand more than is taught that shows companies that the graduate takes initiative and is constantly on the quest to improve. Graduates should be ready for challenges and want to invest their time in their jobs and push through these challenges according to HRP6. HRP6 said that a quality graduate is "somebody who is hungry and ready to learn, who can take on challenges" (Appendix D). GP12 mentioned that quality graduates are willing to learn since the majority of what is learnt in the workplace is new: "I think a quality graduate as far as I'm concerned would be someone who's just keen to learn new things" (Appendix D).

ii) The ability to solve problems

Graduates are required to solve problems since this is essential to the software development role within companies. This skill can be developed in the workplace but if the graduate demonstrates the ability to solve problems and think critically, the graduate is one step closer to being a quality graduate. Viccica and Goodell (2017) posit that problem-solving skills are important and that universities need to teach in a way that responds to employer expectations which are focused on problem-solving, critical and creative thinking. Brilingaite et al. (2018) mention that using a problem-based module to guide the curriculum will expose the student to the way work is done in the industry. More attention should be placed on simulating business

and real-world situations that allow students to be exposed to real-life problem-solving (Tseng et al., 2019).

iii) Work experience

The ideal graduate would be someone who has work experience. This is the most lacking when graduates entered the workplace. Employers find it challenging to fill ICT job vacancies because of lack of experience and lack of workplace competencies (Anicic et al., 2017). According to HRP19, any work experience, even if not related to the IT industry, is useful. HRP19 mentioned,

> "When I say work experience, it does not have to be and it probably won't be in IT, but even if they have waited or they have worked as a cashier, any of those sorts of skills that They are learning, just interacting with other individuals is something that we definitely look for" (Appendix D).

Work experience would expose the graduate to understanding company structures and the responsibilities associated with being in the workplace. Graduates could be exposed to other colleagues enhancing their communication and interpersonal skills. The ability to work in a team would be nurtured and grown in any environment since the graduate would get exposure to various scenarios that would involve people from varying departments within the company.

According to Garousi (2019), graduates face difficulties in their first jobs because of the misalignment between curriculum and the needs of the industry. Magagula et al. (2020) posit that a graduate-focused view of work readiness should drive the interactions between universities, students and industry. HRP11 adds that a quality graduate would be someone with some hands on experience and that the experience could be in the form of their own work where they have mimicked the work environment. During a study that was done where IT leaders and IT internship students were asked what they thought important skills were, the IT leaders felt that work experience to be important (AlGhamdi, 2019). A pre-requisite of work readiness should be a well-defined practical training that allows for the integration between the curriculum and practical work experience. Work-seeker support strategies are important to those who are from poor economic backgrounds to combat the unemployment of graduates (Graham et al., 2019).

iv) Communication

The ability to communicate is important when graduates enter the workplace since they are exposed to people from various departments within a company and would need to communicate with their team members. Communication can be taught at university level in the form of theory and explaining situations, but it can only truly be applied when the graduate enters the workplace. Communication is indicative of a quality graduate and in some instances

is found to be more valuable than technical skills. Tan and Paul (2018) mentions that various scholars have emphasised the importance of outcome-based education such as problem-solving skills, teamwork, communication skills, creativity, critical thinking and long-term learning. These are more important to know than to learn various topics and should be added to programs taken by students. Technical skills can be taught but communication and other soft skills are less likely to be perfected. According to Alshare and Sewailem (2018), educators emphasise the importance of hard skills while the industry emphasises the importance of soft skills. Businesses value soft skills to grow and improve their business. This could indicate that there is not efficient communication between business and universities.

v) Student performance

Employers are also barely satisfied with the performance of graduates. This can be explained in three ways:

a) Important skills are not taught at institutions.
b) Skills possessed by the graduates are not important or relevant to the business.
c) Main objectives of business and institutions differ e.g., business to excel vs future business leaders.

O' Sullivan (2016) points to a profound need to make changes between and inside industries and the curriculum to better prepare students for the workplace. Wolff and Booth (2017) state that employers often complain that the studies are not current in the ever-changing workplace with regards to technology, data analysis or the larger context of working. Capretz, Ahmed and da Silva (2017) emphasise the need for soft skills to be taken more seriously in industry and even in coursework and mention that many of the software product problems are human facts like teamwork, motivation, emotions, commitment, leadership etc. and that these factors are not given nearly as much attention as technical problems.

vi) Applying theoretical knowledge

The ability to apply theoretical knowledge has been identified as an attribute in defining a quality graduate. This means that graduates can start at a company with minimal need for technical training. GP8 mentioned that a quality graduate must have the ability to apply their theoretical knowledge: "if they don't have the ability to extrapolate from that base knowledge, they are going to fall flat pretty fast" (Appendix D). GP21 agreed and said that the point is to apply theoretical knowledge: "The big thing is to apply your theory. So many people, everyone who's a graduate: The assumption is they passed some theoretical test and they know some theory" (Appendix D). This is only attainable in the workplace, and O' Sullivan (2016) argues that the best way to learn is through theory and practical and that there is a profound need to

make changes between and inside industry and curriculum to better prepare students for what is needed in the workplace.

vii) Graduate personality characteristics

A quality graduate would be confident and humble according to participants in this study. If graduates are confident, they may be able to communicate easier and may not be intimidated by the newness of the environment they are in. participants are of the opinion that humble graduates are teachable and as such be able to transition into the company easier than a "know-it-all" graduate. Learning is part of the graduate journey and companies frown upon those who are unteachable. GP4 mentioned that a quality graduate is "someone who is confident, bold and able to ask questions irrespective of whether they felt they were out of their depth" (Appendix D). These graduates are also able to take initiative and often reach out to help those who are struggling with a problem. GP4 defined a quality graduate as "someone who can boldly take on work and ask questions and not be scared to do that and also ask questions and be inquisitive. It helps the employee as well as the employer, so it works both ways, I'm sure my manager really appreciates it when I ask questions" (Appendix D). An interesting observation is that a quality graduate is someone who has confidence, is assertive, respectful and has self-respect according to GP16. It is worthy to note that confidence and having a positive attitude are key to graduates who are not as outspoken as others. Those who have the confidence to openly communicate can help the other team members who as yet are not comfortable in communicating with other team members. Shah et al. (2015) posit that these are the most important skills when employing graduates: communication, teamwork, integrity, intellectual ability and confidence and that these skills were of high importance but low performance when graduates entered the workplace. Byrne (2022) mentions that perceived employability is affected by the graduates' individual characteristics, results during their studies and their ability to exemplify their skill. Work experience has a great effect on employability.

The characteristic identified by the participants as being the most important is that graduates have the willingness to learn. This is followed by the ability to take initiative and then determination, ability to adapt to change and humility. Willingness to learn is critical since the discrepancy between what the graduate learns versus the workplace requires the graduate to be willing to learn and take initiative.

Key characteristics include being humble and willing to learn, according to HRP6: "The product that we have is very complex so you would need to invest your time in really understanding the business as a whole and not being one minded" (Appendix D). SSP14 agreed and mentioned that "grit and a willingness to keep learning are two of the most important

characteristics that I would look for in a graduate" (Appendix D). The literature indicates that willingness to learn is a key characteristic of a quality graduate. Hollister et al. (2017) mention that employers seek graduates that are honest, reliable, motivated, has good communication skills and are willing to learn. Professional maturity like taking the initiative is key to the graduates' employability and is a positive addition for the employer (Chhinzer & Russo, 2018).

Being humble and taking initiative align with the willingness to learn, since the graduate need to receive feedback provided by peers or seniors and apply the required changes. SSP2 said that graduates need to be humble because of "that empirical process that you've executed a piece of work and that you've got feedback on it and then taking that feedback and what's making that work better. So that whole process of reviewing with the peer-to-peer system" (Appendix D). SSP5 agreed that graduates need to be humble and said: "I really want smart guys who are humble and hungry. So, you can tell this person wants to succeed but at the same time has no ego at all or very little ego and he is always available when someone wants to ask something, even if it is very low level" (Appendix D).

In general, the results indicate that the characteristics for an ideal graduate include: i) taking initiative, ii) willingness to learn, iii) being humble, iv) being a team player, v) honesty, vi) the ability to solve problems, vii) the ability to adapt to change, viii) being self-motivated, ix) having positive attitude and x) being determined to succeed.

5.2.3 Summary

An ideal graduate is a graduate who has a good balance between technical and interpersonal skills. The most important skills required by graduates are the ability to solve problems and the ability to communicate. Graduates are required to work in a team and collaborate which would require the ability to communicate. Graduates enter the workplace lacking key skills leaving the employer dissatisfied. The majority of the employers are dissatisfied with the graduates' soft skills and other personal traits deemed important by industry. This could be a result of the emphasis given to theoretical knowledge which makes up the core of the graduate's course work.

Graduates are required to possess certain characteristics that contribute to being an ideal graduate. Graduates must be willing to learn, have the ability to problem solve but also be humble, be honest, determination, have the ability to take initiative and have the confidence to ask questions when needed.

The required skills and characteristics together formulate what an ideal graduate is and can therefore not work in isolation of each other. The graduate can have the technical skills but without the interpersonal skills and characteristics that is required, the graduate will be seen

to be lacking. A balance in terms of a realistic expectation of the employee and that of the employer as well as good communication is needed to get as close as possible to an ideal graduate.

5.3 Theme 2: Testing of graduates for employment

5.3.1 Introduction

The skills required by industry versus skills graduates possess when they enter the workplace have historically been an area of concern. This study shows that employers have increased the importance on a number of skills that graduates should have but that employers perceive graduates are graduating with weaker capabilities of these skills (Shah et al., 2015). There is a profound need to make changes between and inside industry and curriculum to better prepare students for that which is needed in the workplace (O' Sullivan, 2016). Employers often mention that the studies are not current in the ever changing workplace with regards to technology, data analysis or the larger context of working (Wolff & Booth, 2017). There is evidence that students are not prepared for industry and that there should be closer communication between industry and universities (Chillas et al., 2015). Cvetkovic et al. (2019) mention that the most common issue facing graduates entering the workplace is a lack of knowledge not thoroughly covered at university.

Graduates enter the workplace with less than desired competencies and companies test graduates using various screening tests/steps to assess their skills acquired during their studies. Screening tests or interviews are also used to assess the graduates' interpersonal skills and culture fit. These test results from screening are used as benchmarks for future graduate testing for employment to understand how the company needs to integrate the graduate into the workplace. This theme strives to understand the testing of graduates for employment by answering RQ1, RSQ 1.1, RSQ 1.2, RSQ 1.3 and RQ2, RSQ 2.1, RSQ 2.2, RSQ 2.3.

5.3.2 The job description

The screening process starts with the formulating of a job description which initiates the thought process of what is required for the job the company is recruiting for. Job descriptions are important when employing graduates since the graduate will first be exposed to an advertisement containing the job description before they apply for the job. It is therefore imperative to understand who creates the job descriptions and what this process entails.

Job descriptions were mostly done by hiring managers, heads of engineering and line managers. The managers would include senior developers or team leads in the creation of job descriptions so as to encourage a sense of involvement by other team members. Job descriptions would include the required skills and characteristics that the graduates would

need to successfully integrate and positively add to the workplace. Graduates are an important part of the labour force but rapid changes in the world economy and new trends in the workplace has made companies more selective in choosing the right person for the job (Harun et al., 2017). These characteristics are sourced from the previous successful appointment of graduates, senior staff together with other team members identify the characteristics, sourced online and tweaked as per company specifications, extracted from the companies' values and cultural requirements and HR has a role to play in identifying suitable characteristics for employment. SSP5 mentioned,

> "It's a joint venture, typically for each department. The department heads are responsible for job descriptions, so it would be myself, it would be the director I report to and a couple of the senior engineers who will be involved in that also and then we will involve HR because HR will have to improve the structure and so on" (Appendix D).

HR managers are responsible for ensuring that the correct remuneration package is given based on the budget allocated for the job, as SSP15 stated: "Obviously in terms of expected salary ranges, that would also need to have a discussion with HR because obviously they have their limits on specific roles and what it is that we can remunerate" (Appendix D). Briedis et al. (2019) mention when interviewing possible graduates, remuneration and identifying what work the graduate will do are the key to employment.

Outside tools are also used to create job descriptions, and some companies have a team creating job descriptions to standardise these before sending it to the line manager to review and approve. HRP19 mentioned that an outside tool is used and regularly refined because of the ever-changing technologies: "We've got a global team and we are, we use a job, something called Radford, which is an international job grading system. All of our jobs descriptions are written and standardised on a global level" (Appendix D).

Companies use previous successful graduates as a benchmark for new recruits. Most companies use their vision and cultural requirements to extract ideal characteristics that graduates should have when entering the workplace, as indicated by SSP2: "Continuous learning, feedback cycles, passion those kinds of things. Those are actually our imbedded values. Those characteristics come out of our value system within our technology space. So it's not defined per say but if somebody doesn't have that they simply won't fit" (Appendix D).

A standard template is sourced online and customised to suit the needs of the company, according to SSP5:

> "We would search online and source everything that we need because this isn't a problem that needs to be solved because this has been solved a long time ago right,

so you can just go online and grab a template and look at it and look at exactly the template that suites your company needs at the time and that's good to get you started but as you evolve as a company you can then add or remove things and make sure you come up with something that is custom and fits your idea of an ideal developer as much as possible" (Appendix D).

5.3.3 Testing of graduates

The testing of graduates for employment is being done so that companies can mitigate the risk of employing the unsuitable graduate in respect of their technical ability, interpersonal skills and cultural fit. There is a need to assess graduate quality by employers but there is a lack of this kind of assessment which is a risk of producing many graduates but not quality graduates. This then leads to disconnect between industry and academia and their ability to collaborate to ensure that curriculum is constantly evolving (Shah et al., 2015). Sandri et al. (2018) state that it is vitally important to research the assessing of graduates to understand how graduates apply the knowledge they learnt while studying.

The ideal graduate, based on the skills they have acquired while studying and personally, together with the characteristics required by the workplace, is screened for employability. Employability is a collection of skills, attributes and characteristics that employers expect from workers (Chhinzer & Russo, 2018).

5.3.3.1 Determining which tests to present to graduates

Since the testing of graduates is being explored in this theme, understanding who is involved in setting up the screening tests, who decides on the tests being done by the graduates and HR's role in the process is important to the understanding how of companies determine the tests that are used when testing graduates for employment. HR is involved in setting up the behavioural assessments that the graduate will complete as well as running the cultural interview. HRP1 stated that "the line manager will do the technical assessments, will agree on the technical assessments and then HR, or the systems group assessment specialists will determine, behavioural assessments" (Appendix D). SSP9 said: "I set up all the tests predominantly now, but HR also does have a helping hand with setting up maybe a cultural interview or setting up the ability to phone references" (Appendix D). Senior staff in conjunction with team members set up the technical tests to be done by the graduates. This ensures that team members are part of the screening process so as to allow a constant feedback loop. SSP2 includes the developers who are the future leaders within the company: "So I like to keep it inclusive, I make sure the software engineers are part of that process and from time to time we do change our assessments but that's all done by working very closely with the team" (Appendix D).

These tests are role-based and HR is involved in setting up tests for graduates at certain companies. SSP5 stated that the tests are role-based: “it depends on the role, so its typically the hiring manager. So, each role that is open has a hiring manager who is responsible for the hiring of the candidate” (Appendix D). HRP19 mentioned that technical assessments are set up per department and role: “We’ve got a bit of a battery, but then when it comes to technical assessments, those, the actual managers together with the technical people per department or per team or per job role requirement, they will, then they will customize the question, a technical assessment” (Appendix D). Harun et al. (2017) mention that graduates are an important part of the labour force but rapid changes in the world economy and new trends in the workplace has made companies more selective in choosing the right person for the job. This means that expectations and standards are higher than they were before and that graduates with a high level of soft skills are chosen first. To be employable, the graduate would need to possess achievement skills, be knowledgeable and have good personal attributes.

Senior staff and other development team members decide on which tests are to be done by the graduates. SSP14 mentioned that the team decides: “Myself, along with my, senior developers, we have a, basically just a quick meeting in terms of what kind of tests will be suited for, depending on the role that the graduate is being hired for” (Appendix D). The team lead sets up the coding tests and concept but there is team effort involved, according to SSP18, who said: “I came up with the concept and the requirements of it and the questionnaire we, the team leads came up together with over time” (Appendix D). The same tests are used to test the technical ability of the graduate irrespective of qualifications or education institution the graduate attended, as mentioned by SSP5: “For me the tests are the same because I want to measure everybody on the same scale but what we agreed to as a department the last, the onsite interview should be the same for everyone even if you are a senior engineer” (Appendix D). Tests are based on the special role the graduate is applying for, according to SSP9: “Our tests are very much tailor made specifically to the position that we’re trying to recruit for” (Appendix D). Setting up of tests is a team effort that comprises various persons ranging from software developers to hiring managers to HR managers. This gives the company a variety of personnel to assess the graduates and to objectively arrive at a conclusion as to whether the graduate is suitable for the position or not.

Tests are changed periodically since technology is fast-paced and ever-changing. HRP6 indicated the following: “It’s also good that we review it to ensure that it’s not outdated and that it does speak to somebody coming from a tech or college or university” (Appendix D). Graduates cannot be proficient in recent technologies because the industry updates at a faster rate than the curriculum (Hollister et al., 2017). Kruhlyk (2017) mentions that the amount of knowledge that the graduate will need to know will always be increasing which means by the

time the student graduates, their learnings could be obsolete. There is no fixed rule on when companies change their tests. Tests are updated as required by the company. HRP11 posited that “tests are aligned to the environment and when a new role is added, there is a battery of tests to choose from” (Appendix D). SSP9 mentioned that technical assessments were just marked on the solution but that this process has changed: “Before we just used to look at the technical assessments and be like, that’s great or not great, but now what I try to do as an ask a candidate to actually speak to us about the technical assessment” (Appendix D).

5.3.3.2 The screening process

Companies have their own screening processes which are custom to the role and the company. Graduates are not always well equipped to undergo screening. The criteria being used to evaluate whether graduates are suited for the workplace have changed drastically (Viccica & Goodell, 2017). Baird and Parayitam (2019) posit that universities can also prepare the graduates for the screening process, written communication skills, interpersonal and presentation skills as part of their academic curriculum.

The majority of the participants mentioned that the first part of the process was the screening of CVs against requirements. This step is crucial in ensuring that the graduate meets the minimum requirements of the job specification before the graduate is considered for the interview or take home test. HRP1 mentioned that the first step is to have a well-defined job description that includes technical and behavioural competencies required by the graduate: “For our technical roles, what we do is we very clear around the job specification, and the technical and the behavioural competencies that we’re looking for” (Appendix D). SSP14 said that screening of CVs goes beyond looking at what the graduate has studied but seeks to find whether the graduate is passionate about development and motivated to learn. SSP14 further said the following:

> “And that kind of thing that I look at throughout the process, because that gives me before and, exactly what the candidate is doing and what if they passionate about what they’re doing, and that gives me a good sense of how engaged they are with what they’re learning and what they’re doing from there, if the candidate is suitable, I’ll then email the candidate or call the candidate and then, process a, interview” (Appendix D).

The first part of screening is to vet the CVs against the job description. HRP6 added that “the recruiters will collaborate with hiring managers in terms of what do you need, what are you wanting to achieve? What’s the job spec? What the job spec looks like in order to fulfil that role. Then the recruiters will screen the CVs” (Appendix D).

Depending on the company process, the next part is either a test or the first interview to discuss technical requirements and assess technical ability. All companies used interviews as a step

within the screening process. Technical tests are used to test the graduates' technical ability. These tests are presented to the graduate with a time limit in which the graduate has to complete the test. This puts pressure on the graduate to deliver within a timeframe and the hiring manager can assess how the graduate works under pressure. Test results are marked by the hiring manager or senior staff member and if the graduate is found competent, the graduate will progress to the next step of the process. SSP2 mentioned: "And with that pseudo-code I can still see and assess logic, I can still assess how they will typically work through a scenario cos [sic] once they've submitted that assessment the next step is to work with them and kind of do a code review process" (Appendix D).

There are companies that do not test graduates' technical ability, since their point of reference is only what they learnt during their studies. Testing is costly and 'does not add value when it comes to the graduate, as stated by HRP19: "We don't really do assessments unless it's a specific requirement for a specific role, but we are generally, we look at what they've covered in their qualification, but for the graduates, it doesn't really serve much purpose for us. It hasn't added much value to us. It's mainly, we do validate their qualification" (Appendix D). HRP6 indicated that test kits are reserved for more experienced applicants: "If it is a graduate, we won't be sending off a test kit. That's more for people that have prior experience" (Appendix D). Branstetter and Thomas (2014) mention that employing graduates means they have limited to no experience and that they will not be a saviour for your company. Even if they had internships or worked full time while studying, they were still entry level when applying for jobs (Branstetter & Thomas, 2014). Since most graduates have not been exposed to working in industry, graduates may not be familiar with various tools or processes used by the company and should rather be successfully on boarded by being exposed to tutorials (Briedis et al., 2019).

Interviews are used to assess whether the graduate will fit into the company's culture, behavioural competency and whether graduates have the ability to work in a team. According to Akman and Turhan (2018), behaviours and attitudes of graduates vary depending on their technical and personal skills and educational background. HRP1 mentioned that graduates are narrowed down after the technical assessment and invited to an interview, and stated that "those individuals go through a panel interview, which is competency-based questionnaire, which involves both behavioural questions as well as technical questions" (Appendix D). The need to measure personal qualities using aptitude tests has increased, according to Fulgence (2015). Alshare and Sewailem (2018) mention that businesses value soft skills to grow and improve their business and that the purpose of an institution is to prepare a student for the workplace therefore students performing well in exams is not enough. Ensuring that the graduate understands and uses the feedback loop effectively is key to working in a team,

according to SSP2 who stated the following: “Then you know that in the workplace and in a team environment every day you are expected to write a unit of code, submit it, have someone review it, that feedback and then make it better based on that feedback. It’s a huge component of writing software. If you don’t have that ability to understand that feedback is important and not make you better, it’s a dual aspect, writing code, everybody is responsible for that code base” (Appendix D).

Chhinzer and Russo (2018) mention that employers’ perception of employability includes the graduates’ ability to work in a team and is assessed when graduates apply for a role. Culture fit is vitally important to the company, as mentioned by HRP19: “That’s where you’ll start to see how important that culture and everything is within the organisation” (Appendix D). Hora (2020) posits that employment is often subjective as is the case when employing someone who is a culture fit into the company. Employers are more and more hiring for culture fit within the organisation than on the basis of what the graduate has studied or their technical ability (Hora, 2020). These culture interviews can have HR managers or other staff members who would work with the graduate present. Culture goes beyond the ability to fit into the company culture and requires the will to make a difference, as explained by SSP9: “Remember that the kind of company that we are, we a kind of company, that’s trying to do a, trying to create impact in this, in the unemployment sector of South Africa” (Appendix D). Hora (2020) opines that culture fit encompasses measuring personality, attitude and various cognitive competencies against existing staff members and industry standards. Students need to develop various skills like social, cultural and other soft skills that can be honed in a classroom environment making it easy for the students to recognise and be able to apply these skills in the workplace (Healy et al., 2021).

HRs role in the screening process is supportive to ensure that the process is fair and to assess whether the graduate is a cultural fit and possesses the behavioural competence needed for the role and to integrate into the company. HR should not fully assess or determine a graduates’ employability. Shah et al. (2015) mention that recruitment managers are not necessarily the right people to assess the quality of a graduate correctly and efficiently in the various skill areas. IT employers and not HR determines whether a candidate is employable states Hollister et al. (2017). SSP2 mentioned that HR is essential to the behavioural and culture fit of the organisation:

> “So from their perspective they typically look at the same parameters I do, more specifically behaviour, will the person fit in the company as a whole, they are also very good at understanding how people should typically move through career paths and should pick up anomalies I that space as well and ja, so typically that’s what they would focus on more towards the cultural aspect, making sure that (the person) not only fits into the team but the wider environment” (SSP2, Appendix D).

HR also ensures that the remuneration package is correct and that all contracts pertaining to the employment is drawn up. SSP9 mentioned that HR plays a low-key role in their company because the company is small in size and adds the following: “Like their role then would be phoning references, setting up the screening tests, maybe even setting up the interviews” (Appendix D). HR is essential to the initial screening of the graduate against requirements and once the graduate is employed, ensures that the graduate is inducted into the company. SSP14 stated:

> “HR largely deals with the communication with the graduate, any legal and paperwork with regards to labour laws and the process of the, of the screening process, taking, explaining to them what each step is what’s going to happen as well as then approving and on boarding, you know, once a graduate has gone through the process, if they are successful, then carry on with the process to employ the graduate and bring them into the company” (Appendix D).

Verma et al. (2018) posit that HRMs can however successfully bridge the gap between the workplace and the graduates by decreasing the mismatch between demand and supply by ensuring that the graduates understand what the needs of the employers are. HRMs should adopt a proactive approach to ensure that they address challenges before the graduate starts working for example: continuous feedback, training and correct placement, knowledge transfer, active involvement and mentoring (Verma et al., 2018). Sinha et al. (2020) mention that another way of bridging the gap between curricula and the workplace is if recruiters visit campuses and provide feedback to students on what industry requires.

Success indicators to appoint a quality graduate for employment as identified in this study include:

i) **An above average technical ability:** Technical tests would be given to graduates and assessed by a senior staff member to measure the graduates’ technical ability.
ii) **Ability to apply theoretical knowledge:** It was imperative that graduates had the theoretical knowledge gained during their studies but that the graduates could also apply the knowledge to the problem that was presented and had to be solved.
iii) **Good attitude and displaying behavioural competence:** To assess behaviour and attitude is challenging since true behaviour and attitude will only be realised when the graduate enters the workplace and is exposed to various situations.
iv) **Progression at each step of the screening process:** Companies saw the progression at each step in the process as a success indicator since each step had its own outcomes.
v) **Culture fit and loyalty:** Culture fit is critical when joining a company since the graduate would be expected to work in a team and communicate with various persons in the organisation.

vi) **Remuneration and growth expectation:** Companies needed to know what graduates expected as payment when entering the workplace but also asked graduates what their growth expectations were so as to understand their goals within the organisation.

5.3.3.3 Advantages and disadvantages of screening

The companies would receive many applications and the core advantage of screening was to ensure that companies narrowed down the applicants and increased the likelihood of employing the correct graduate to fit within the organisation technically and culturally. Companies ensure that graduates CVs were screened for job fit by ensuring that the graduate met all the requirements within the job description. GP3 said: “I think the assessment and the interviews one on one is a good way to filter out people that won’t fit into the company based on as many aspects of the job as they can measure” (Appendix D). Screening also allowed the company to gauge whether the graduate was technically fit to meet their requirements and culture but also whether the graduate possessed the correct communication and interpersonal skills required for the job. Companies can employ graduates whose work they have seen, according to GP12: “There is [sic] some advantages in that they getting someone whom they’ve seen, write the code and they can solve problems” (Appendix D). Employers are more and more hiring for culture fit within the organisation than on the basis of what the graduate has studied or their technical ability. This is important for universities to ponder on how to advise students who are about to enter the workplace (Hora, 2020).

A disadvantage of the screening process was that graduates felt intimidated by the process and felt that they were placed under undue pressure which is not a realistic representation of the workplace. Graduates also felt that the technical tests had time limits and graduates were not allowed to use external resources, which was not a true reflection of the day-to-day job of the software developer. Dishonesty could occur and work delivered that was not the work of the graduate being interviewed. SSP14 said that a disadvantage of screening is that you are unsure whether the work done by the graduate is actually the graduates or done by someone else, and mentioned that “having the candidate within the room and asking those questions in real time is still unmatched at this point in my view, because you get to have the graduate in real time, explain to you the concepts and the problems without actually having the time to Google something, find, check, what the answer is” (Appendix D). GP8 said: “It’s once again sort of easy to fake it, sort of easy to cheat, you could ask somebody else to write the coding test for you. This is in comparison to writing the code on the whiteboard with the hiring manager there” (Appendix D). Screening is also subjective and the possibility of the graduate relating to one interviewer and not another does exist. GP3 said the following:

> “You could write a test or you could set a test that doesn’t really assess someone’s knowledge about the things you looking for or the interviews can be a little bit too

subjective in the sense that I might gel well with the particular manager I'm talking to but I might not gel well with everyone else because you know, we might have conflicting personalities" (Appendix D).

Screening is not an exact science and often decisions are made on instinct, leading to misjudging people and situations, as stated by SSP15: "But we dealing with people and soft things, or intangibles it's made difficult to be like, you could read someone completely wrong and you've got a problem down the line" (Appendix D). SSP18 said that HR screening could be too generic, resulting in missed opportunities: "Sometimes on the HR side, they're too generic and that could miss out some talents. If let's say that the person didn't put their CV together properly, not everyone knows everything and not everyone has the skillset to put together a good CV upfront that could be also a disadvantage that they don't actually teach in university as well" (Appendix D). Fulgence (2015) mentions that communication skills, attitude, cv presentation and behavioural qualities were seen as important when successfully recruiting graduates.

5.3.3.4 Measuring success of the screening process and approving the graduate for employment

Measuring the success of the screening process and approving a graduate for employment is company specific. Graduates who have an above-average technical ability and who can apply their theoretical knowledge during testing are indicative of success. SSP15 mentioned the importance of understanding the work and applying your skillset: "The first one you're looking at is in skillset and understanding of the work. It should be the most pertinent one. If don't understand that there's no point" (Appendix D). HRP11 explained that success is measured at the end of each screening step with great emphasis placed on the coding assessment: "So, if they display strengths with respect to those key behavioural competencies and an above average technical competence, that is what would be a measure of success" (Appendix D).

Graduates are assessed on their attitudes and whether they possessed a "can-do" attitude and a willingness to learn. Their behavioural competence is essential to their successful employment. SSP2 stated that graduates need to have a good attitude and behavioural competence, and added the following: "To me, it's more around behaviour. Can you be moulded? Another key success factor is the graduate's willingness to learn" (Appendix D). SSP9 said that culture fit is important in the screening process, but added that "another success factor is confidence and determination in their ability and how graduates apply those factors to the software they create". SSP18 mentioned that candidates are successful during the screening process when they are determined to succeed, have a good attitude and an above average technical knowledge: "The main successful indicator will be their problem solving around their implementation of the test" (Appendix D). Companies would measure the

success of the graduate when the graduate progresses through the various steps within the screening process.

'It is interesting to note that apart from culture fit, loyalty to the company was mentioned as a success factor during the screening process. HRP6 said that a graduate who is determined to learn will be successful, and added: "Because at the end of the day, what we want to do is after your intern, we would like to offer this person a permanent role, but it's also dependent on if the person's willing to stick it out" (Appendix D). Companies want to know they are investing in graduates that do not only want to learn and then leave for better opportunities; they are interested in graduates that are motivated to learn irrespective of the remuneration package on offer. SSP15 said: "We're looking at what is your expected remuneration, what is your expected return from the company outside of actual monetary value" (Appendix D). Exposing graduates to various departments within the company allows the graduate to learn about the overall company structure and stakeholders on the project. This also allows the graduate to evaluate their career and where they could possibly fit in the future (Briedis et al., 2019). Baird and Parayitam (2019) indicate that employers look for interpersonal skills and problem-solving ability before their final decision to employ a graduate.

The success rate of the screening tests has mostly resulted in the employment of the correct graduate but factors such as organisational pressure due to time constraints could rush the process, thereby resulting in an unsuitable graduate, as indicated by SSP5: "You don't get a lot of applications in but you are being pushed to hire someone then you end up hiring someone that wouldn't typically suite your standards" (Appendix D). There is a high demand for IT graduates, but companies are reluctant to hire graduates who do not possess the required skills (Lundberg et al., 2021). Screening may also result in employing the incorrect graduate because the graduate could presents a solution to the technical test that was done by someone else. It is challenging to assess graduates' behavioural competence during screening, which could result in a technically strong candidate with poor behavioural or interpersonal skills.

Sandri et al. (2018) emphasise the need for measuring graduate capabilities post-degree completion and the various challenges accompanying this. Institutions provide students with the necessary capabilities for their careers, but measuring the graduates' uptake and application of said sustainability capabilities is important in creating sustainable curricula to educate future students (Sandri et al., 2018).

5.3.4 Summary

Testing of graduates for employability has increased. It has become a combination of testing whether the graduate has the technical, interpersonal and behavioural abilities required by the company. There seems to be an increase in using assessment tests other than mere looking

at academic results during the recruitment process. The marketability of graduates depends on whether they possess certain skills needed by industry. The job description is the first step in finding the most suitable graduate because this sets the blueprint of the technical skills, interpersonal skills and potential culture fit requirements the graduate should have.

Screening starts by screening against this job description and then assesses the graduates' technical ability in the form of a test given to the graduate to complete. While this test is useful to the company, it poses the risk of losing unsuitable graduates due to the graduate feeling intimidated or just not understanding the test or being put under pressure to complete the test in a set time. HRs involvement in the screening process is to ensure that the process is fair but also to ensure that the graduate is a culture fit and possesses the necessary behavioural skills required for the position. HR is however not the ideal decision maker when it comes to deciding on whether the graduate is employable and rather plays a supportive role in the screening process.

'It is unrealistic to be of the opinion that graduates can be prepared for specific skills and specific characteristics suited to a particular workplace environment. These unrealistic expectations can be attributed to the uniqueness of each company's environment, own structure, knowledge areas, culture and political structure. An advantage shared by many is that the screening process weeds out unwanted applicants and in so doing ensures that valuable time is not wasted. Employers can assess the graduates' technical ability to a certain extent though not fully since graduates could present someone else's work as their own. Behavioural capabilities are difficult to assess using screening tests and can only fully be assessed once the graduate is employed.

Senior staff are of the opinion that screening tests are necessary to ensure the company employs the correct candidate that will fit into their company culture and have the necessary technical skills required. It is important to pair the suitable graduate to the correct job. Graduates feel that screening tests are intimidating, lack real-life simulation and cannot fully assess the graduates' ability. While testing may result in the employment of the correct graduate, this is not a perfect process, and as can be seen from the data, pressures from management and the ability of the graduate to be dishonest could result in the employment of an unsuitable graduate. The screening process is subjective, and this may result in an unfavourable outcome.

The success of the screening process is dependent on what the company deems success to be. Some companies measure the success of screening by the graduates' progression through the process and others by the quality of the solution applied during the technical test. Moreover,

companies are employing for culture fit and behavioural competencies to ensure that graduates can fit into the organisation on a global scale.

5.4 Theme 3: Post-employment evaluation, training and development for graduates

5.4.1 Introduction

Graduates who are employed after they have completed their studies should receive training in the workplace. Companies should groom the graduates and mould them into the environment so that the graduates can be integrated into the company culture and processes. Employers are encouraged to support employees by offering support in learning as technologies are constantly evolving in industry and the world (Sacolick & Mateo, 2022). Omoniwa and Adedapo (2017) state that though graduates possessed some skills satisfactory for employment, but in some cases are not enough to meet the requirements of the specific job. Lundberg et al. (2021) mention that graduates are still required to undergo training within the workplace irrespective of receiving good grades during their studies. The amount of knowledge that the graduate will need to know will always be increasing and by the time the student graduates, their learnings could be obsolete (Kruhlyk, 2017). Despite screening and testing, identifying what graduates are lacking can only be realised once the graduates are employed and have started working. The quality of training the graduate in industry should be geared at equipping the graduates with practical or industry skills (Omoniwa & Adedapo, 2017). Tuzun et al. (2018) mention that companies have supplementary training when graduates are employed with the focus on knowledge areas not sufficiently covered in universities. An indicator of how effective the training at universities is comes into play once graduates are employed (Kruhlyk, 2017).

To discuss the theme of the graduates' post-employment evaluation, training and development, this study will explore whether companies have a set program post-employment and whether graduates are trained and developed in areas that have been identified as lacking by the senior staff. This study will also explore the process of evaluation of the graduate and whether this evaluation, training and development have a positive impact on the graduates' ability to contribute to the company. Post-employment strategies and measuring of graduate success.

Once graduates are employed, a process of evaluation is in place to ensure that the graduate is meeting various outcomes as set by the company. Hong et al. (2022) posit that companies are required to successfully introduce a graduate into a job and remunerate them accordingly. These outcomes are set by the company to ensure that graduates successfully transition from their studies to the workplace and that the company's needs are met. The development of students' employability will be more effective and cover a wider range of skills if professionals

in the workplace are intentional about their role in cultivating fertile learning environments as students journey through university to the workplace (Healy et al., 2021).

Most companies use a set program to evaluate progress, e.g., Company 2 uses a project that mimics the processes they use. An effective process of evaluation is giving an induction project to graduates prior to client work. GP3 said that graduates are given a small project to test their technical skills: “That induction project was a lot of learning and upskilling us into the technologies that are maintained by the company so for example I didn’t know angular or .NET core which are two of the major frameworks used by the company” (Appendix D). Companies are required to be ready to receive the graduate which means that the company must know what the graduate is to work on during the first five days of employment (Briedis et al., 2019). This helps them identify gaps in learning so as to train the employees. This is an effective means of evaluation since the graduate is exposed to the processes and technologies without the pressure of delivering to clients. At each step, the graduates have mentors assessing their progress and offering training on areas identified for improvement. This also introduces the graduate to one-on-one feedback that companies adopt to ensure that graduates have focused feedback. Employees can use their existing staff to monitor interns while they coach them on problem solving and decision making (Jaradat, 2017).

Another form of evaluation is a six-month probation period where the company identifies various outcomes or KPIs that the graduate has to reach. SSP15 mentioned that “you have to look at the improvement and the rate of improvement more than the output at the end of the day because this is a graduate you are dealing with” (Appendix D). Graduates will use this time to learn the technologies and are offered in-house training on skills that require further development. Baird and Parayitam (2019) opine that employers are as responsible for the growth and development of graduates as universities because growth can only be achieved if industry and universities partner together. A structured induction programme would be useful to ensure that graduates are confident, are familiar with the workplace and have been introduced to other team members (Roepen, 2017).

In-house training and online training is offered as opposed to formal training for skills that are lacking after the graduate has been assessed, and on-the-job training is seen as more valuable than formal training because it is practical and sporadic. The learning does however not stop institution level; the workplace needs to further develop graduates’ skills by allowing collaboration and familiarising the graduate with the company’s practices (Lundberg et al., 2021). There are however companies who do not have a training or development program in place but encourage continuous learning within the company. Graduates are allowed to upskill as they deem fit even if the upskilling is not a requirement within the company. Students

mention that there is a lack of opportunities for students to apply their knowledge to real-life scenarios relevant in the workplace like in team-based situations or internships where students will be exposed to the workplace (Wolff & Booth, 2017). Other companies prefer upskilling to align with the company, as indicated by SSP18: “They can upskill themselves as long as it’s within the alignment of the company and what we actually working with” (Appendix D). Real-world examples are the key to developing the graduate and providing true context, allowing the graduate to grow by doing (Sandri et al., 2018).

Companies try to avoid performance review processes, since these are costly to the company. Graduates are assessed, performance improvement plans are put in place and if those measures are not attained, graduates are placed on a formal performance review process. When graduates enter the workplace, they are required to understand how the company works and mould into the company culture. Workplace knowledge and culture cannot be taught at university but focusing on the graduates’ grades and extramural activities can give a clear indication of alignment with various company skills and traits (Lundberg et al., 2021). HRP7 said that all check-ins are documented and stored in the HR system that will be used when a graduate is not successful and mentioned that “the manager would obviously have to prove that they did everything that they could to set the person up for success, if they couldn’t do the work that we needed them to do then obviously you would look at an exit process” (Appendix D). Graduates are put through a performance review process, but this has to be holistic and incorporate personal factors according to SSP15: “At the time it might just be circumstances that caused them not to perform. You don’t know what’s happening in people’s personal lives. You don’t know what’s going on wherever and that could be affecting as well. So there is a performance process but also a personal process you have to follow” (Appendix D).

5.5 Summary

Testing of graduates can be beneficial to the company but at the same time can risk the employment of the incorrect graduate. Graduates are intimidated and are not trained to undergo screening and interviews. The industry should provide universities with organisational cultural information so as to familiarise students on the possible industry cultural requirements before being interviewed for a job placement. Core competencies and critical skills like thinking analytically, technological ability, strategic thinking, problem-solving, communication and collaboration is screened by companies during interviews but the skill to participate in an interview is not imparted on the graduate. Screening does not guarantee favourable employment and some companies in this study prefer not to test graduates since graduates have no work experience and testing will not be effective. Literature is limited as to the testing of graduates and whether this is the correct method of measuring graduate employability since graduates only possess knowledge obtained during their studies.

5.6 Discussion summary

Themes have been discussed in relation to RQs and RSQs in conjunction with literature and responses received during interviews with the participants in this study. RSQ 1.1 aimed to determine what characteristics and skills the company have identified so as to define a quality graduate. The answer to this question indicates that the most important skills lacking (work experience, interpersonal skills, ability to apply theoretical knowledge, problem-solving skills, teamwork and collaboration) when graduates enter the workplace are linked to the required characteristics (willingness to learn, ability to take initiative, humility, ability to adapt to change, determination, ability to work in teams, good attitude) as well as the required critical skills (problem-solving skills, communication skills, team-work, formal education, willingness to learn, interpersonal skills, critical thinking, ability to take initiative), and forms part of the company's identification of what a quality graduate is. The findings are conclusive that a quality graduate is someone who is willing to learn, has the ability to solve problems, takes initiative, can work in a team and collaborate, has interpersonal and good communication skills, and is able to apply theoretical knowledge. The findings agree with previous studies.

RSQ 1.2 aimed to determine the criteria used in filtering applicants and then choosing a certain graduate to interview. To answer this question, understanding the screening process and success indicators was imperative. Findings show that companies have their own custom screening process, constituting anything from 1 to 5 steps. All companies initially screen CVs against the job requirements before advancing the candidate to the second step. Depending on the company, the second step is an initial interview or a take-home test that the graduates need to complete. All companies make use of interviews to assess whether graduates will be a cultural fit, since this is required to successfully communicate with various people in the organisation and enhancing the graduates' ability to work within a team.

In RSQ 1.3, the aim was to understand whether the preferred testing is beneficial to both the company and the graduate. A further aim was to identify whether tests are changed based on favourable or unfavourable outcomes. The findings revealed that the SSP and HRP participants understood the value of screening as a means of measuring technical and behavioural ability. With screening, hiring managers are able to assess the graduates' ability early in the process, thereby avoiding wasting time. The screening is also used to determine the graduates culture fit within the organisation. There are multiple points for objective decision making, and progression through the steps is favourable. The findings revealed that the honesty of graduates completing the tests is questioned and behavioural competence is challenging to assess during screening. GPs found screening to be beneficial but indicated that testing graduates may result in the graduate not being employed because: i) graduates are intimidated by the process, ii) graduates are tested on skills they acquired at the beginning

of their studies, which they no longer use or apply, iii) tests are too technical and have time limits, and iv) graduates are not allowed to use external resources while completing the technical test, which is not a true reflection of the workplace. Screening has however resulted in the employment of suitable graduates more often than not.

For RSQ 2.1, the researcher sought to evaluate whether the tests meet the mentioned criteria that are used to determine if a graduate is fit for employment. Job descriptions are drafted for technical ability and job-specific characteristics are included. Graduates are assessed on culture fit within the organisation. The findings revealed that companies determine characteristics that graduates need to display by i) using the values and mission of the company, ii) using previous recruits as a benchmark, or iii) finding a template online and customising the template according to the company's needs. Job descriptions are mostly drafted by the hiring managers in conjunction with HR managers. Larger companies have specialised teams to standardise job descriptions across the organisation.

RSQ 2.2 aimed to explore which factors are used to formulate the tests used by the company to ensure that the graduate fits the description of skills required by the company. It is important to understand HRs role in the screening process, who is involved in setting up the tests, and who chooses the tests that need to be completed by graduates. A further aim was to identify whether tests are changed based on qualifications or education institutions. The findings revealed that HR mostly plays a supportive role in the screening process. HR is involved in the culture interview to assess behavioural competence and culture fit. HR is the initial contact and then ensures that employment contracts are correct and that graduates are inducted into the company. Screening tests are set up by technical staff (e.g., hiring managers, senior software developers and team leaders), and testing needs to be fair and without bias to a certain qualification or education institution.

In RSQ 2.3, the researcher set out to determine whether a process of evaluation is in place that allows graduates to be evaluated post-employment, and whether graduates are further trained or developed. The findings revealed that the process of evaluation after a graduate is employed, is custom to the companies. Some companies assign mentors to graduates; for others companies, daily, bi-weekly or monthly check-ins is a means of feedback for the graduate on progression after employment. The findings further revealed that companies have various indicators in place to measure post-success in the form of i) KPIs and ii) predefined outcomes and objectives. Training is not always formal, but many companies adopt the informal on-the-job training approach to ensure that graduates receive the required training for skills that are lacking. Companies have in-house training and access to online training academies to develop their skills. However, if graduates are not deemed a quality graduate,

the company proceeds with a formal performance process once they have proven that their improvement plans (train, rectify, re-assess) has been unsuccessful.

The next chapter concludes this study and recommends possible future research drawn from the results of this study.

CHAPTER 6: CONCLUSION AND RECOMMENDATION

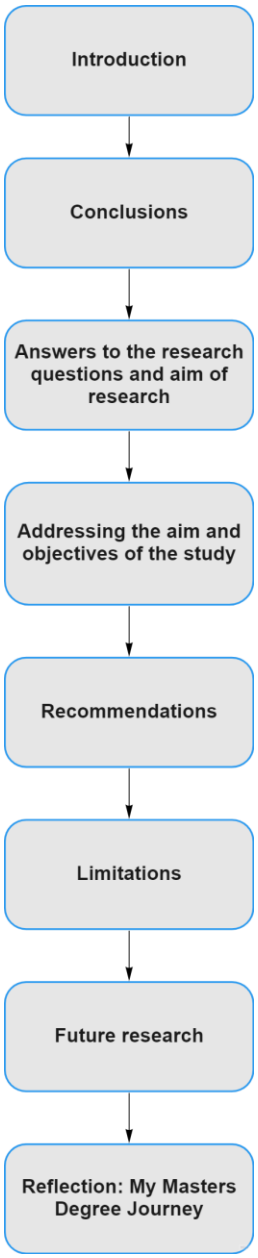


Figure 6.1: Layout of Chapter 6

6.1 Introduction

In this chapter, the conclusion, recommendations and answers to the RQs are presented and linked to the aim and objective of this study. Limitations are presented and future research proposed to further explore assessment before employment and the development post-employment of graduates.

The gap between academia and industry has been a topic of research for many years leaving the industry dissatisfied with the skills that graduates possess when they enter the workplace. The majority of the employees are dissatisfied with the graduates' soft skills, other personal traits deemed important by industry and the lack of technical skills which ultimately results from the training (Garousi et al., 2020; Suleman & Costa Laranjeiro, 2018).

There is a need to assess graduate quality by employers but there is a lack of this kind of assessment which is a risk of producing too many graduates but not quality graduates. This then leads to disconnect between industry and academia and their ability to collaborate to ensure that the curriculum is constantly evolving (Shah et al., 2015). Core competencies and critical skills such as thinking analytically, technological ability, strategic thinking, problem-solving, communication and collaboration are screened by companies during interviews but the skill to participate in an interview is not imparted on the graduate (Baird & Parayitam, 2019). Graduates are tested to determine whether they are technically, interpersonally and culturally fit to join a company. The tests are custom to the company and has become a popular means of gauging the graduates' skills and readiness for the workplace.

The aim of the study was to explore how organisations determine the fit (knowledge, skills, logic and problem-solving ability) of the IT graduate when applying for a position within the company.

6.2 Conclusions

The results from the study show that all the companies use screen tests to determine whether a graduate has the skills required by the company. Companies use screen tests to test: i) technical ability and skills, ii) behavioural competence, iii) interpersonal skills, and iv) culture fit.

These tests are specific to the company and no company uses the same set of tests for assessing the technical ability of the graduate. Behavioural testing is done during interviews to best assess whether graduates meet these requirements. Assessment can only be completed once the graduate starts at the company, interacts with the other team members and employees and is part of the processes and tasks of the organisation. While graduates are graduating with baseline technical skills, companies need to train graduates in skills that

they are lacking. Interpersonal skills are found to be lacking when graduates enter the workplace which is in line with previous research studies.

Culture fit is assessed during interviews and HRM's are tasked to identify whether the graduate will fit into the culture of the organisation. The research results reveal that this has become increasingly important for the organisation and the successful transition of the graduate from their studies into the workplace.

The results from the study conclude that the quality of the tests is based on the perception of the company performing the test. Companies believe that their testing has mostly yielded favourable results when seeking to employ quality graduates. The graduates, however, feel that testing places them under unnecessary pressure to perform when they are not equipped for testing on this level and require more guidance and training from education institutions.

6.3 Answers to the research questions and aim of research

6.3.1 RQ1: What criteria are used for identifying graduates for placements in IT companies?

The criteria used to identify graduates for placements within the workplace are described by exploring and understanding i) the characteristics and skills the company uses to define what a quality graduate is, ii) company tests that are done prior to the employment of the graduate and iii) the advantages and disadvantages of these company-specific tests to determine the fit of the graduate for employment.

6.3.1.1 RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

Characteristics that a company uses to define a quality graduate:

i) A quality graduate is defined as a graduate who takes initiative, is willing to learn and can solve problems which links to the company's characteristics that are required when graduates enter the workplace.
ii) The most important characteristic that companies look for when employing graduates is their willingness to learn.
iii) Companies also mention that graduates must have good interpersonal skills and have the ability to work in a team and collaborate.
iv) Characteristics that companies look for is that a graduate must be able to adapt to change and be able to display a level of humility when doing so.
v) Graduates are also required to be honest, forward thinking and be hard working.
vi) Determination and good attitude of graduates are popular characteristics among companies as key to defining a quality graduate.

vii) Graduates should also possess a level of behavioural competence conducive to the workplace environment.

Skills that a company uses to define a quality graduate:

i) The most critical skill when defining a quality graduate is someone with the ability to solve problems and who has good communication skills.
ii) Graduates require a formal education and year-long or short term certification do not suffice when companies identify quality graduates.
iii) Companies also want to employ graduates that can adapt to the ever-changing environment by working in a team, solving problems, taking the initiative to do so.
iv) Graduates need to possess the skill to work independently, pay attention to detail and handle pressure positively.

6.3.1.2 RSQ 1.2: What company tests are done by graduates before entering employment?

i) The first level is to screen CVs against the job specification or job description allowing the company to narrow down applicants based on requirements.
ii) All companies use interviews as part of the screening process to assess the cultural fit, interpersonal skills and behavioural competence of the graduate.
iii) In-house coding tests are used to assess the graduates' technical ability.
iv) These tests are used as success indicators to measure employability by:
    a) Assessing technical ability and whether the graduate has the ability to apply their technical knowledge.
    b) Having a good attitude and displaying behavioural and technical competence.
    c) Assessing culture fit and loyalty to the company
    d) The graduates' ability to progress successfully through each step in the screening process.

6.3.1.3 RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the graduate to the company?

i) Advantages of using tests to determine the graduates' fit include:
    a) Early detection of the graduates' ability and whether the graduate possesses the minimum requirements for the job.
    b) Avoiding unnecessary time wasting by assessing the graduates' ability to solve problems prior to employing the graduate.
    c) Assessing whether the graduate is a culture fit, has interpersonal skills, and the ability to handle pressure.
    d) Assessing the graduates' ability to effectively communicate and listen.

e) Allows for multiple decision points for objective decision making.

ii) Disadvantages of the screening process include:

a) The inability to fully assess the graduates' abilities as required by the company.
b) Graduates feel intimidated by the process resulting in the possibility of underperforming during the screening process.
c) The inability to completely assess graduates' behavioural and interpersonal skills and whether the graduate has been honest in their application of the solution during the technical test.
d) Technical tests that are too technical and has time limits that are unrealistic resulting in the possible loss of the suitable graduate.
e) An inability to use external resources which is not a true reflection of solving problems within the workplace.
f) Screening tests are subjective and places undue pressure on the graduates.

6.3.2 RQ2: How are tests articulated to successfully employ a quality graduate?

Tests are articulated to successfully employ a graduate by i) identifying how companies determine the required characteristics and skills of the graduate, ii) identifying how companies determine which tests are suitable for the graduate and iii) identifying whether the companies have a success strategy post-employment to ensure that tests are constantly updated and relevant.

6.3.2.1 RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

i) Characteristics are based on previous successful appointments and used for future recruitment.
ii) Senior staff and other team members are involved in identifying the characteristics and skills required by future graduates.
iii) Characteristics are sourced from the values of the company and from cultural requirements of the company.
iv) HR is involved in identifying the characteristics required.
v) Job descriptions are created by the hiring managers, line managers and heads of engineering that will list all the required characteristics and skills that are required by the graduate for successful employment.
vi) Job descriptions are based on the roles and these roles have specific skills as identified by the senior staff of the company.
vii) HR ensures that the job description is aligned to the correct remuneration package within the allocated budget for the role.

6.3.2.2 RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

i) Senior staff together with various team members are involved in setting up the tests for graduates.
ii) HR is involved in identifying suitable tests for graduates and ensures that graduates meet the behavioural and cultural requirements of the company.
iii) Senior staff together with team members from the development team determine which tests are to be done by the graduate for the role the graduate is applying for.
iv) Tests are the same for all graduates irrespective of qualification or education institution and are role based.

6.3.3.3 RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

i) The success strategy of the graduate is company specific and feedback loops for future testing is custom to the needs of the company.
ii) Tests are changed periodically to align with company and industry standards.
iii) An effective measurement of success post-employment is an induction program to fully assess the graduates' technical ability.
iv) A probation period with clear responsibilities and outcomes is used to assess the graduates' ability.
v) Mentors are assigned to graduates post-employment resulting in a feedback loop for future assessments.
vi) Predefined outcomes, objectives and KPIs are used as success indicators post-employment.
vii) On-the-job and online training is offered to graduates who lack various technical skills that are required by the company.
viii) Some companies do not have success indicators other than task completion and there are no formal training plans in place for the graduate.
ix) Graduates who are not identified as quality graduates are put through a performance review process if the graduate has not been able to be trained and successfully re-assessed to rectify the skills that are lacking.

6.4 Addressing the aim and objectives of the study

6.4.1 Aim of study

The aim of the study is to explore how organisations determine the fit (knowledge, skills, logic and problem-solving ability) of the IT graduate when applying for a position within the company.

6.4.2 Objectives of the study

The objective of the study is to determine what tests are taken by the enterprise to determine IT graduates' ability/potential before they are employed as part of their application process. This study will also endeavour to examine how these tests or methods confirm that the software development graduates being employed are quality graduates. A further objective is to determine how these tests are developed and constructed.

The results have addressed the aim and objectives of the study as set at the beginning. The study results reveal that organisations use screening tests to determine the fit of the IT graduate when applying for a position in the company. Before the company test graduates, job descriptions are formulated for the role that the graduate has to fill. This job description lists the required skills and characteristics the company is looking for in the successful graduate. These characteristics and skills are sourced from previous employees, values of the company and industry-specific needs. Most of the companies use coding tests to assess the graduates' technical ability. These tests are set up by hiring managers, team leads and other senior developers and periodically changed to keep with industry standards and technologies. However, there are companies that feel it inadequate to test the graduates' abilities since they do not possess a skill level conducive to testing and testing would just waste time and money. Tests are custom to each company and the level of testing is subject to the role that the graduate is to fill within the company. All companies use interviews to assess the cultural, behavioural and interpersonal skills of the graduate though mention that graduates behavioural competence can only truly be assessed once the graduate is in the workplace.

When graduates progress from one step to the next, companies see this progression as confirmation that the graduate possesses the correct skills to move onto the next step. Other success indicators post-employment to assess the evaluation strategy is in the form of KPIs, predefined outcomes and check-ins to measure whether the graduate is a quality graduate and where changes to the evaluation strategy has to be made.

6.5 Recommendations

Reviewing the findings and themes of this study, the following recommendations that can be made to ensure that graduates are better equipped for testing when applying for positions within a company:

The following recommendations are to ensure that companies are better equipped to test graduates for employment and to further develop these graduates:

i) Companies need to mindful of the limitations graduates who apply for a position within their company might have and create testing to accommodate this.
ii) Companies need to use tests that are designed by professionals for the specific aspect that is being tested.

iii) Professional should evaluate the test results.
iv) Companies need to ensure that a development plan is set out for the graduates when they enter the workplace and that feedback is consistent and constructive allowing the graduates to grow their skills.

The following recommendations are listed for universities to make graduates as “work ready” as they can:

i) Universities need to identify and approach companies to ensure that the gap in what companies technically require from graduates are decreasing and to ensure that graduates are technically able in the workplace.
ii) Universities need to review their curriculum to incorporate more interpersonal skills and real-world simulation to bridge the gap between work readiness and curriculum.
iii) Universities to partner with companies to make graduates work ready by helping them with CV writing, interview etiquette and communication required when applying for a position.

6.6 Limitations

This research was done in Cape Town and was done for software development graduates only. If this research was extended to other towns and a larger data set, there could be a broader view of the relevance of testing for graduates across various industries/positions.

Another limitation was the number of participants. Increasing the amount of HR and SS participants would’ve added to the research and given more data to work with. The HR and SS participants are part of the hiring team and as such their feedback were important to the success of the study.

6.7 Future research

i) More in-depth research is needed to understand how companies approach further development of graduates and implement the development of graduates when they have started working.
ii) Future research is needed on the impact of any type of work experience on the interpersonal skills, communication and teamwork and collaboration skills of graduates who enter the workplace.
iii) Future research is needed to ascertain how often the curriculum should be revisited at universities to keep updated with current technologies and whether this is a viable exercise.
iv) More in-depth research is needed in creating ways to incorporate real-world scenarios in the curriculum.

v) Future research is needed to assess whether there is a lack in communication between industry and learning institutions.

6.8 Reflection: My Master's degree journey

My first attempt at doing my masters ended in 2013 when my illness became a problem and diagnosing it became an increasing challenge. At the time, the most sensible choice was to stop studying but I vowed that, at some point, I would start again. In 2016 I was diagnosed with spastic paraplegia, a hereditary disorder that results in spasticity. By then, my walking and speech had been affected but I still continued with life as normally as I could, after all, I could still walk, drive and talk, just with some difficulty.

The opportunity to restart my studies came in 2019 and I decided to register and pursue this qualification. I think at the time I really just wanted to complete what I had started but not fully committing myself. I thought I had time, I had four years in which to complete this Master's qualification and so I did not rush anything, I was taking my time. I remember my dad being so incredibly proud of me for restarting and he would always ask how it was going. My dad was always so encouraging of studying and of progression that he would be ready to step in if I needed to attend to my studies and needed his help with carting my boys for extra-mural activities. 2020 came and just before Covid happened, my dad sadly passed away. I was shattered and my studies took an immediate halt. In fact, so did my life, everything just stood still. Add Covid to the equation and you wonder how you'd ever get through the mess, the trauma.

I picked myself up and realised I now had extra motivation to complete my studies. I wanted to make my dad proud even though he wouldn't physically be able to attend my graduation. My husband and my boys were supportive and just showed love, and I was ready to go. I was far behind and though my supervisor would send messages for completion, I was not setting myself goals. Dr Andre De La Harpe kept encouraging me to push through and so my journey continued. Looking back, I find this odd in my behaviour because as a project manager, my job is to set goals and deliver. I did not give my studies the priority it required or deserved. I had 2 choices, either to push through and complete my studies or to stop and forfeit all the time and money I had put in. The latter was not an option and so I started working hard to complete my data collection and analysis. The proposal was a challenge in itself because the academia terminology sounded like something out of a sci-fi movie. I would watch videos to explain, would Google the terms, would read research books but still these terms would leave me clueless. There were times I thought I understood and as soon as I tried to apply it, I would realise that I did not quite understand to begin with. I continued and completed my proposal

and when it was approved and I read the feedback, I had a spring in my step and I was ready to move on.

Trying to source participants was challenging. I approached so many companies, too many to keep track of and received many rejection emails. I found that people did not want to participate because of time constraints and it seemed that Covid had put many activities on the backlog that participants would rather spend that time on work or personal activities. The other challenge was to get available time for interviews and to get documentation signed off. I felt like a nag when I repeatedly emailed participants for information or to ask them to please sign the documentation I required. Eventually, I ended up with 8 companies and 21 participants. I was probably being overly optimistic thinking I could interview 40 people, I thought people would jump at the opportunity to help students in their research. How wrong I was. I spent countless hours transcribing and reading and communicating with participants.

Once I was done with the analysis, it was time to write. I have to say that I do enjoy writing but writing for academia is a completely different format. I could only use certain terminology and the wording had to be unambiguous and structured for academia. This was an interesting and challenging time and it took me 2.5 months to write my first chapter. I had discovered that I should have saved my files differently, named them differently and from the onset used “participant” instead of the participants’ real names. Structuring my data could’ve been better and transcribing should have been faster and easier. I was procrastinating instead of pushing forward and creating achievable goals per day. I had no plan of delivery and this made delivering hard.

In hindsight, I do wish I spent more time on my studies so that I could’ve given each deliverable more time and thought. I should have created a project plan and had a structure for my documents, interviews and chapters. This would’ve saved me much of the cleaning up of data and structure that I had to do when I started writing my first chapter. I also should have maintained a certain momentum avoiding going back to reread what I set out to do in my proposal. There are many lessons I will take from this experience but the biggest has to be that “time waits for no woman” and that procrastination leads to stressful situations. There are many things I would’ve done differently, many that were in my control but at the end I finished my thesis and will walk proudly as I receive the recognition during graduation. Onwards and Upwards!

REFERENCES

Akman, I. & Turhan, C. 2018. Investigation of employers' performance expectations for new IT graduates in individual and team work settings for software development. *Information Technology and People,* 31(1):199-214.

Al-Ababneh, M. 2020. Linking ontology, epistemology and research methodology. *Science & Philosophy,* 8(1):75-91.

AlGhamdi, R. 2019. Fostering information technology students' internship program. *Education and Information Technologies,* 24(3). doi:10.1007/s10639-019-09891-6.

Alshare, K. & Sewailem, M.F. 2018. A gap analysis of business students' skills in the 21st century: A case study of Qatar. *Academy of Educational Leadership Journal,* 22(1):1-22.

Anicic, K.P., Divjak, B. & Arbana, K. 2017. Preparing ICT graduates for real-world challenges: Results of a meta-analysis. *IEEE Transactions on Education,* 60(3):191-197.

Archer, C. 1983. What does business and industry expect from computer science graduates today? *ACM SIGCSE Bulletin,* 15(1):82-84.

Armstrong, R. 2019. Elaborating a critical realist approach to soft systems methodology. *Systemic Practice and Action Research,* 32(4):463-480.

Babbie, E. & Mouton, J. 2015. *The practice of social research.* Cape Town: Oxford University Press South Africa.

Baird, A.M. & Parayitam, S. 2019. Employers' ratings of importance of skills and competencies college graduates need to get hired: Evidence from the New England region of USA. *Education and Training,* 61(5):622-634.

Balina, S. Rozita, K & Steinbuka, I. 2017. ICT industry's challenge in Latvia. *European Research Studies Journal*, 20(3): 820-832.

Bender, D. 2021. Internship assessment in professional program accreditation: A 10-year study. *Education and Training,* 63(2):256-270.

Beyrouti, N. 2017. Digital technology management and educational innovation: The marketability and employability of the higher education degrees. *The Journal of Developing Areas,* 51(1):391-400.

Bilan, Y., Mishchuk, H., Roshchyk, I. & Joshi, O. 2020. Hiring and retaining skilled employees in SMEs: Problems in human resource practices and links with organisational success. *Business: Theory and Practice,* 21(2):780-791.

Bilau, A.A., Witt, E. & Lill, I. 2018. Research methodology for the development of a framework for managing post-disaster housing reconstruction. *Procedia Engineering,* 212(2017):598-605.

Branstetter, C. & Thomas, C. 2014. *Hiring new graduates.* imageSource.

Briedis, K., Chen, Y. & Markel, S. 2019. Ten simple rules for successfully hosting an intern at a scientific software company. *PLoS Computational Biology,* 15(6):1-5.

Brilingaite, A., Bukauskas, L. & Juskeviciene, A. 2018. Competency assessment in problem-based learning projects of information technologies students. *Informatics in Education,* 17(1):21-44.

Bryman, A. Bell, E., Hirschsohn, P., Dos Santos, A., Du Toit, J & Masenge, A. 2014. *Research methodology: Business and management contexts.* Oxford University Press Southern Africa.

Burkholder, G.J., Cox, K.A., Crawford, L. M. & Hitchcock, J.H. 2019. *Research design and methods: An applied guide for the scholar-practitioner.* USA: Sage.

Butum, L.C. & Nicolescu, L. 2019. Learn and Work in the 21st Century. A review of employability models for HE graduates: Different levels of analysis. *Management Dynamics in the Knowledge Economy,* 7(10):71-86.

Byrne, C. 2022. What determines perceived graduate employability? Exploring the effects of personal characteristics, academic achievements and graduate skills in a survey experiment. *Studies in Higher Education,* 47(1),:159-176.

Capretz, L.F., Ahmed, F. & Da Silva, F.Q. 2017. Soft sides of software. *Information and Software Technology,* 92:92-94.

Chan Mow, I., Sasa, H., Maua-Faamau, F., Mauai, E. & Tanielu, T. 2015. An evaluation of relevance of computing curricula to industry needs. *Systemics, Cybernetics and Informatics,* 13(1):7-12.

Charles, B.K. & Florah, O.M. 2021. A critical review of literature on employment selection tests. *Journal of Human Resource and Sustainability Studies,* 9(3):451-469.

Chhinzer, N. & Russo, A.M. 2018. An exploration of employer perceptions of graduate student employability. *Education and Training,* 60(1):104-120.

Chillas, S., Marks, A. & Galloway, L. 2015. Learning to labour: An evaluation of internships and employability in the ICT sector. *New Technology, Work and Employment,* 30(1):1-15.

Chou, C.-Y., Tseng, S.-F., Wang, C.-J., Chao, P.-Y., Chen, Z.-H., Lai, K.R., Chan, C.-L. & Yu, L.-C. 2018. Learning analytics on graduates' academic records to reflect on a competency-based curriculum. *Computer Applications in Engineering Education,* 26(6):2168-2182.

Clark, M. 2018. Rethinking graduate employability: The role of capital, individual attributes and context. *Studies in Higher Education,* 43(11):1923-1937.

Cohen, Y. & Pfeffer, J. 1986. Organisational hiring standards. *Administrative Science Quarterly,* 31(1):1-24.

Collins, C.S. & Stockton, C.M. 2018. The central role of theory in qualitative research. *International Journal of Qualitative Methods,* 17:1-10.

Creswell, J.W. 2009. *Research design: Qualitative, quantitative and mixed methods approaches.* 3rd ed. United States of America: Sage.

Creswell, J.W. & Creswell, J.D. 2017. *Research design: Qualitative, quantitative, and mixed methods approaches.* 5th ed. Los Angeles: Sage.

Creswell, J.W. & Miller, G.A. 1997. Research methodologies and the doctoral process. *New Directions for Higher Education,* (99):33-46.

Creswell, J.W. & Poth, C.N., 2017. *Qualitative Inquiry and Research Design: Choosing Among Five Approaches.* Fourth Edition ed. s.l.:s.n.

Cvetkovic, B.N., Gligorijević, M., Petković, D., Jović, S., Milovančević, M. & Nikolić, V. 2019. Evaluation of information and communication technology sector in the teaching process and strategic collaboration between universities and industry. *Computer Applications in Engineering Education,* 27(3):653-662.

Damoah, O.B., Peprah, A.A. & Brefo, K.O. 2021. Does higher education equip graduate students with the employability skills employers require? The perceptions of employers in Ghana. *Journal of Further and Higher Education,* 45(10):1311-1324.

Dean, B. 2018. The interpretivist and the learner. *International Journal of Doctoral Studies,* Volume 13:1-8.

Easterby-Smith, M., Thorpe, R. & Jackson, P.R. 2015. *Management and business research.* 5th ed. Los Angeles: Sage.

Ebner, K., Soucek, R. & Selenko, E. 2021. Perceived quality of internships and employability perceptions: The mediating role of career-entry worries. *Education and Training,* 63(4):579-596.

Exter, M., Caskurlu, S. & Fernandez, T. 2018. Comparing computing professionals' perceptions of importance of skills and knowledge on the job and coverage in undergraduate experiences. *ACM Transactions on Computing Education,* 18(4):1-29.

Figueiredo, H., Biscaia, R., Rocha, V. & Teixeira, P., 2017. Should we start worrying? Mass higher education, skill demand and the increasingly complex landscape of young graduates' employment. *Studies in Higher Education,* 42(8), pp. 1401-1420.

Fulgence, K. 2015. Factors influencing graduates recruitment decisions: The case of Tanzania corporate recruiters. *Academy of Educational Leadership Journal,* 19(1):195-216.

Gabor, M.R., Blaga, P. & Matis, C. 2019. Supporting employability by a skills assessment innovative tool-Sustainable transnational insights from employers. *Sustainability (Switzerland),* 12(11).

Garousi, V., Giray, G., Tüzün, E., Catal, C. & Felderer. 2019. Aligning software engineering education with industrial needs: A meta-analysis. *Journal of Systems and Software,* 156, 65-83.

Garousi, V., Giray, G., Tüzün, E., Catal, C. & Felderer, M. 2020. Closing the gap between software engineering education and industrial needs. *IEEE Software,* 37(2):68-72.

Gelo, O., Braakmann, D. & Benetka, G., 2008. Quantitative and qualitative research: Beyond the debate. *Integrative Psychological & Behavioral Science,* 42(3):266-90.

Goldkuhl, G. 2012. Pragmatism vs interpretivism in qualitative information systems research. *European Journal of Information Systems,* 21(2):135-146.

Goles, T. & Hirschheim, R. 2000. The paradigm is dead, the paradigm is dead...long live the paradigm: the legacy of Burrell and Morgan. *The International Journal of Management Science,* 28(3):249-268.

Graham, L., Williams, L. & Chisoro, C. 2019. Barriers to the labour market for unemployed graduates in South Africa. *Journal of Education and Work,* 32(4):360-376.

Harun, H., Salleh, R., Baharom, M.N. & Memom, M.A., 2017. Employability skills and attributes of engineering and technology graduates from employers' perspective: Important vs. satisfaction. *Global Business and Management Research: An International Journal,* 9(1):572-581.

Healy, M., Brown, J. & Ho, C. 2021. Graduate employability as a professional proto-jurisdiction in higher education. *Higher Education,* 83, 1125-1142.

Hollister, J.M., Spears, L.I., Mardis, M.A., Lee, J., McClure, C.R. & Liebman, E. 2017. Employers' perspectives on new information technology technicians' employability in North Florida. *Education and Training,* 59(9):929-945.

Hong, S., Yang, C., Wen, H., Song, C., Shi, J., Chen, S. & Hu, X. 2022. A dual-network modeling architecture for statistical evaluation of college graduates' working ability in consistence with their job position and remuneration. *Computational Intelligence and Neuroscience,* 2022, 1-10.

Hora, M.T. 2020. Hiring as cultural gatekeeping into occupational communities: Implications for higher education and student employability. *Higher Education,* 79(2):307-324.

Jaradat, G.M. 2017. Internship training in computer science: Exploring student satisfaction levels. *Evaluation and Program Planning,* 63:109-115.

Jayasingam, S., Fujiwara, Y. & Thurasamy, R. 2018. 'I am competent so I can be choosy': Choosiness and its implication on graduate employability. *Studies in Higher Education,* 43(7):1119-1134.

Johnson, B., Holness, K., Porter, W. & Hernandez, A. 2018. Complex adaptive systems of systems: A grounded theory approach. *The Grounded Theory Review,* 17(1):52.

Joranli, I. 2018. Managing organisational knowledge through recruitment: Searching and selecting embodied competencies. *Journal of Knowledge Management,* 22(1):183-200.

Khampirat, B., Pop, C. & Bandaranaike, S. 2019. The effectiveness of work-integrated learning in developing student work skills: A case study of Thailand. *International Journal of Work-Integrated Learning,* 20(2):127-146.

Killam, L.A. 2013. *Research terminology simplified: Paradigms, axiology, ontology, epistemology and methodology.* Sudbury, ON: Author.

Kothari, C.R. 2004. *Research methodology: Methods and techniques.* 2nd ed. New Delhi: New Age International.

Kruhlyk, V. 2017. Satisfaction of qualification requirements of employers applied to software engineers in the process of training at higher educational institutions. *Information Technologies in Education,* 1(30):71-80.

Leedy, P.D. & Ormrod, J.E. 2015. *Practical research planning and design.* 11th ed. England: Pearson.

Lin, Y. 2019. Impacts of a flipped classroom with a smart learning diagnosis system on students' learning performance, perception, and problem solving ability in a software engineering course. *Computers in Human Behavior,* 95:187-196.

Lundberg, G.M., Krogstie, B. & Krogstie, J. 2021. From employable to fully operational: The need for training of computer science graduates. *International Journal of Engineering Pedagogy,* 11(3):21-38.

Magagula, K., Maziriri, E.T. & Saurombe, M.D., 2020. Navigating on the precursors of work readiness amongst students in Johannesburg, South Africa. *SA Journal of Industrial Psychology,* 46:1-11.

Moore, T. & Morton, J., 2017. The myth of job readiness? Written communication, employability, and the 'skills gap' in higher education. *Studies in Higher Education,* 42(3):591-609.

Mukherjee, S.P. 2020. *A guide to research methodology: An overview of research problems, tasks and methods.* New York: Taylor & Francis Group.

Nabaho, L., Aguti, J.N. & Oonyu, J. 2017. Making sense of an elusive concept: Academics' perspectives of quality in higher education. *Higher Learning Research Communications,* 7(2):25-45.

Naros, M. & Simionescu, M. 2019. The role of education in ensuring skilled human capital for companies. *Theoretical and Empirical Researches in Urban Management,* 14(1):75-84.

O' Sullivan, J.A. 2016. Change requires change! Information technology, student preparedness and industry collaboration: Supporting the bridging process between education and training with innovative solutions. *Systemics, Cybernetics and Informatics,* 14(3):18-21.

Omoniwa, O.B. & Adedapo, A.A. 2017. Assessing Nigerian graduate employability. *Global Journal of Business Disciplines,* 1(2):58-75.

Osmani, M., Weerakkody, V. & Hindi, N. 2017. Graduate attributes in higher education: Examining academics' perception in the Middle East. *Journal of Education for Business,* 92(2):53-64.

Pertegal-Felices, M.L., Castejon-Costa, J.L. & Jimeno-Morenilla, A. 2014. Differences between the personal, social and emotional profiles of teaching and computer engineering professionals and students. *Studies in Higher Education,* 39(7):1185-1201.

Plice, R.K. & Reinig, B.A. 2007. Aligning the information systems curriculum with the needs of industry and graduates. *The Journal of Computer Information Systems,* 48(1):22-30.

Pratt, J.A., Keys, A. & Wirkus, T. 2014. Preparing information systems graduates for a complex society: Aligning IS curricula with liberal education learning outcomes. *Journal of Information Systems Education,* 25(1):35-44.

Rajadurai, J., Sapuan, N.M., Daud, S. & Abidin, N. 2018. The marketability of technical graduates from Higher Educational Institutions (HEIs) offering Technical and Vocational Education and Training (TVET): A Case from Malaysia. *Asia-Pacific Education Researcher,* 27(2):137-144.

Roepen, D., 2017. Australian business graduates' perceptions of non-technical skills within the workplace. *Education and Training,* 59(5):457-470.

Rose, P.S., Teo, S.T., Nguyen, D. & Nguyen, N.P. 2021. Intern to employee conversion via person-organisation fit. *Education and Training,* 63(5):793-807.

Sachdeva, J.K. 2008. *Business research methodology.* Himalaya Publishing House.

Sacolick, I. & Mateo, S. 2022. *How to hire and retain developers in a hybrid working world.* InfoWorld.com. [Online]. Available at: https://www.infoworld.com/article/3648657/how-to-hire-and-retain-developers-in-a-hybrid-working-world.html [Accessed: 7 November 2022].

Sandri, O., Holdsworth, S. & Thomas, I. 2018. Assessing graduate sustainability capability post-degree completion: Why is it important and what are the challenges? *International Journal of Sustainability in Higher Education,* 19(1):2-4.

Sarkar, M., Overtan, T., Thompson, T.D. & Rayner, G. 2020. Academics' perspectives of the teaching and development of generic employability skills in science curricula. *Higher Education Research and Development,* 39(2):346-361.

Saunders, M., Lewis, P. & Thornhill, A. 2009. *Research methods for business students.* 5th ed. Italy: Pearson Education.

Saunders, M., Lewis, P. & Thornhill, A. 2019. *Research methods for business students.* 8th ed. Italy: Pearson.

Scholtz, D. 2020. Assessing workplace-based learning. *International Journal of Work-Integrated Learning,* 21(1):25-35.

Scott, F.J. Connell, P. Thomson, L.A. & Willison, D. 2019. Empowering students by enhancing their employability skills. *Journal of Further and Higher Education*, 43(5):692-707.

Shah, M., Grebennikov, L. & Nair, C.S. 2015. A decade of study on employer feedback on the quality of university graduates. *Quality Assurance in Education,* 23(3):262-278.

Siddoo, V., Sawattawee, J., Janchai, W. & Thinnukool, O. 2019. An exploratory study of digital workforce competency in Thailand. *Heliyon,* 5(5):e01723.

Silverman, D. 2013. *Doing qualitative research.* 4th ed. London: Sage.

Sinha, S., Ghosh, P. & Mishra, A. 2020. Employability of fresh engineering graduates in India: A fresh look applying Expectation Confirmation Theory. *Education and Training,* 62(1):47-63.

Smith, C., Ferns, S. & Russell, L. 2019. Placement quality has a greater impact on employability than placement structure or duration. *International Journal of Work-Integrated Learning,* 20(1):115-29.

Suleman, F. & Costa Laranjeiro, A.M. 2018. The employability skills of graduates and employers' options in Portugal. *Education and Training,* 60(9):1097-1111.

Sultana, S.G. & Reed, P.A. 2018. Curriculum for an introductory computer science course: Identifying recommendations from academia and industry. *Journal of Technology Studies,* 43(2):80-92.

Tamin, M.D., Du Plooy, D.M., Von Solms, S. & Meyer, J.A. 2019. Proposed modular work integrated learning framework for South Africa. *IEEE Access,* 7:2559-2566.

Tan, Y.L. & Paul, D. 2018. Aligning IS Master's programs with industry. *Journal of Information Systems Education,* 29(3):169-183.

Tseng, H., Yi, X. & Yeh, H. 2019. Learning-related soft skills among online business students in higher education: Grade level and managerial role differences in self-regulation, motivation, and social skill. *Computers in Human Behavior,* 95:179-186.

Tubaishat, A. 2015. Issues in informing science and information technology can e-portfolio improve students' readiness to find an IT career?. *Issues in Informing Science and Information Technology,* 12:198-202.

Tuzun, E., Erdogmus, H. & Ozbilgin, I.G. 2018. Are computer science and engineering graduates ready for the software industry? Experiences from an industrial student training program. *Proceedings.* The 40th International Conference on Software Engineering: Software Engineering Education and Training (ICSE-SEET '18:), 20 May 2018, 68-77. doi:10.1145/3183377.3185754.

Twinomurinzi, H., Schoefield, A., Hagen, L., Molefe, S.D. & Tshidzumba, N.A. 2017. Towards a shared worldview on e-skills: A discourse between government, industry and academia on the ICT skills paradox. *South African Computer Journal,* 29(3):215-237.

Undurrage, R. 2019. Who will get the job? Hiring practices and inequalities in the Chilean labour market. *Bulletin of Latin American Research,* 38(5):575-590.

Verma, P., Nankervis, A., Priyono, S., Saleh, N.M., Connell, J. et al. 2018. Graduate work-readiness challenges in the Asia-Pacific region and the role of HRM. *Equality, Diversity and Inclusion,* 37(2):121-137.

Viccica, P. & Goodell, L. 2017. *Bridging the gap between campus and* workplace. UB University Press.

Weathington, B.L., Cunningham, C.J. & Pittenger, D.J. 2012. *Understanding business research.* Canada: John Wiley & Sons.

Wickramasinghe, V. & Perera, L. 2010. Graduates', university lecturers' and employers' perceptions towards employability skills. *Education and Training,* 52(3):226-244.

Wolff, R. & Booth, M. 2017. Bridging the gap: Creating a new approach for assuring 21st century employability skills. *Change: The Magazine of Higher Learning,* 49(6):51-54.

Yin, R. K., 2003. *Designing case studies.* s.l.:SAGE Publications.

Yin, R. K., 2011. *Applications of case study research.* 3rd ed. s.l.:SAGE Publications.

APPENDIX A: EXAMPLE OF INDIVIDUAL CONSENT

Faculty of Business and Management Sciences Ethics Informed Consent Form

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Category of Participants (tick as appropriate):

Staff/Workers		*Teachers*		*Parents*		*Lecturers*		*Students*	
Other (specify)									

You are kindly invited to participate in a research study being conducted by Sonya Lietch from the Cape Peninsula University of Technology. The findings of this study will contribute towards (tick as appropriate):

An undergraduate project		*A conference paper*	
An Honours' project		*A published journal article*	
A Masters/doctoral thesis	*x*	*A published report*	

Selection criteria
You were selected as a possible participant in this study because you are:

(a) Deep understanding and practical experience in the field of study.
(b) Seniority in Company

The information below gives details about the study to help you decide whether you would want to participate.

Title of the research:
The relevance of company specific tests for IT graduate appointments in Cape Town, South Africa

A brief explanation of what the research involves:
The aim of the study is to explore how organisations determine the fit (knowledge, skills, logic and problem solving ability) of the graduate when applying for a position within the company.

The objective of the study is to determine what tests are taken by the graduates before they are employed as part of their application process. This study will also endeavour to examine how these tests or methods confirm that the software development (SD) graduates being employed are quality graduates. A further objective is to determine how these tests are developed and constructed.

Procedures (*Interview or Self-administer questionnaire otherwise create your own***)**

If you volunteer to participate in this study the following will be done:

1. Your company needs to identify relevant employees to participate in the study.
2. Individual appointments will be made with the employee.
3. Participation will be in the form of an interview where semi-structured questions will be asked.
4. Before the interview, the questionnaire will be mailed to the participant in order for the participant ant if he/she wants to can prepare for the meeting.
5. Every participant will be given an individual consent form to sign.
6. All the interviewees will be asked for permission to record the interviews and also take some note where applicable.
7. The interview will not be longer than 40 minutes.
8. The participants will be treated with respect and it will be made clear that the participant can withdraw from the interview at any time. The participant can also even after the interview with draw from the study.
9. Participants will be given the option of omitting questions they do not want to answer or feel uncomfortable with.
10. In a case where there is a lack of clarity, the participants will be allowed to ask for confirmation or clarity of words/sentences/phrases to ensure accuracy of the data collected.
11. Participants will be told that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs.
12. Participants will be informed that questions do not pose any realistic risk of distress or discomfort, either physically or psychologically, to them.
13. Participants will be informed that the transcribed interview will be mailed to them in order to check and validate the transcription for correctness of content and meaning.

You are invited to contact the researchers should you have any questions about the research before or during the study. You will be free to withdraw your participation at any time without having to give a reason.

Kindly complete the table below before participating in the research.

Tick the appropriate column		
Statement	Yes	No
1. I understand the purpose of the research.	x	
2. I understand what the research requires of me.	x	
3. I volunteer to take part in the research.	x	
4. I know that I can withdraw at any time.		
5. I understand that there will not be any form of discrimination against me because of my participation or non-participation.		
6. Comment:		

Please sign the consent form. You will be given a copy of this form on request.

	2020/09/10
Signature of participant	Date

Researchers

	Name:	Surname:	Contact details:
1.	Sonja Lynn	Lietch	0728756912 sonjalietch@gmail.com
2.	Andre	de la Harpe	0824481058 andre@cencra.com
3.			

Contact person:	
Contact number:	Email:

APPENDIX B: INTERVIEW GUIDE FOR HR AND SENIOR STAFF

RQ1: What criteria are used for identifying graduates for placements in IT companies?
RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?
IQ 1.1.1: What skills are lacking when graduates enter the workplace? Comment:
IQ 1.1.2: What in your opinion is a quality graduate? Comment:
IQ 1.1.3: What characteristics do you look for when employing a graduate and why? Comment:
IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position? Comment:
RSQ 1.2: What company tests are done by graduates before entering employment?
IQ 1.2.1: Explain the screening process and tools used at each step. Comment:
IQ 1.2.2: What are the success indicators that approve a graduate for employment? Comment:
RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the graduated to the company?
IQ 1.3.1: What are the advantages of using these screening tests? Comment:
IQ 1.3.2: What are the disadvantages of using these screening tests? Comment:
IQ 1.3.3: Has the results of the testing ever been incorrect, resulting in the employment of the unsuitable graduate or in not employing a possibly suitable candidate? Comment:

RQ2: How are tests articulated to successfully employ a quality graduate?
RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?
IQ 2.1.1: Who creates the job description of the positions within your company? Comment:
IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from? Comment:
RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?
IQ 2.2.1: Who is involved in setting up the screening tests? Comment:
IQ 2.2.2: What is the role of HR in the screening process? Comment:
IQ 2.2.3: Who decides which tests are to be done by the graduate? Comment:
IQ 2.2.4: Are the same tests used for every software development graduate or are the tests customised based on qualifications and education institution? Comment:
RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?
IQ 2.3.1: What is the process of evaluation after the graduate is employed? Comment:
IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/ development program setup for the graduate? Comment:
IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate? Comment:

APPENDIX C: INTERVIEW GUIDE FOR GRADUATES

RQ1: What criteria are used for identifying graduates for placements in IT companies?
RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?
IQ 1.1.1: What skills are lacking when graduates enter the workplace? Comment:
IQ 1.1.2: What in your opinion is a quality graduate? Comment:
IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position? Comment:
RSQ 1.2: What company tests are done by graduates before entering employment?
IQ 1.2.1: Explain the screening process and tools used at each step. Comment:
RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?
IQ 1.3.1: What are the advantages of using these screening tests? Comment:
IQ 1.3.2: What are the disadvantages of using these screening tests? Comment:
RQ2: How are tests articulated to successfully employ a quality graduate?
SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?
IQ 2.1.1: What is the process of evaluation after the graduate is employed? Comment:
IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/ development program setup for the graduate? Comment:

APPENDIX D: INTERVIEW TRANSCRIPTIONS

PARTICIPANT 1

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: I think that graduates have a fair amount of technical knowledge, in some instances, and it depends on where they did their studies, they are limited, they have limited application. They have limited application experience of the knowledge that they've learned in respect to the technical knowledge and skills. I think that the… it's more on the behavioural competence side that is lacking, with graduates, and particularly in the, IT environment. There's this approach to, where graduates are used to working fairly independently. When you enter the work environment, there's a need to be more collaborative and to work within teams. In fact, that our IT, definitely our IT data, and dev teams are structured into sub teams and they work across business areas. There's that, the behavioural competence of teamwork and collaboration, there's also some interpersonal skills that they lack. EQ in some instances, when, it does feel like I'm generalizing somewhat, but I mean, I've, in engaging with existing juniors and, or, not so much graduates, and even as they move through the ranks, some of these behavioural competencies are still, still require development.

Off the top of my head, it's largely the behavioural competencies that need further development. In some instances, the technical, the application of the technical knowledge, because sometimes it's very theoretical.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: Look, I think it would be an individual who has the ability to apply theoretical technical knowledge that they've gained, and that, and apply it across different scenarios. That for me, talks to their problem solving and conceptual thinking ability and also, and an individual is fairly balanced in terms of their behavioural style, so they're able to work independently and they could work with in a team. They are not, they're able to, take initiative, and also ask for help. So, there's a lot of balance. I mean, the competencies that I mentioned may seem like they're on polar ends of the spectrum, but I think it's about the individual demonstrating a bit of both and displaying a balance with respect to that.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: I think we obviously and definitely in the IT space, I think a lot of individuals are quite creative, they quite knowledgeable in some instances, in a lot of instances they are quite bright and eager. What you looking for is somebody that doesn't just focus on their technical specialist area, that's

made the effort to understand the business, your business. I mean, they wouldn't necessarily understand the business environment, but they've done their research. They've, they've looked a bit broader than just being able to talk about the role that they're applying for. You want somebody who, as I say, can work independently and in a team, and that will use their initiative.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: I think it's definitely, they do have to have a, a, or maybe our environment's a bit strict like that, but they probably have to have an above average technical knowledge. There's a good, there's a good knowledge of the different, coding languages that they may be familiar with. They must be able to translate some of that language across, some of that knowledge across coding languages, or at least even if they're not trained in a particular coding language, they can make sense of it, given the base knowledge that they have. Sorry, what was the question again? What are the key skills, the key things we look for?

Yes. That sound very sound technical knowledge, good communication skills, problem solving ability. And, as I say, they have to be action oriented, so they can take instruction and then use the initiative and run with it and deliver.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Okay. For our technical roles, what we do is… we [are] very clear around the job specification, and the technical and the behavioural competencies that we're looking for. We will, use a baseline technical test, which usually involves either interpreting code, or producing a bit of code for us as the, initial, one, so w we started, let me take a step back before they get to that theory, the recruiter will or when I was doing it, we would screen against those technical and behavioural competencies. With the CVs we'll have a telephonic with the individuals, just with that short list, with that long list, just to get an understanding of whether the CV aligns, you know, they could talk to what's on the CV. There'll be a shorter list from that whom we then put through this, either this, simulation, which is either develop a bit of code for us, or interpret a bit of code.

We then shortlist to that in further short list or screens, and those individuals go through a panel interview, which is competency-based questionnaire, which involves both behavioural questions as well as technical questions. And, then the decision is made, and obviously the assessment technical assessment, sorry, these behavioural assessments we do as well, personality and cognitive, and the technical assessment, behavioural assessments, and the outcome of the panel interview all get integrated, in the decision-making process.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

RESPONDENT: It's, we, as I said, above average, so we're looking at about 60% and above in terms of the accomplishment on their technical assessment and that they display strengths in the key behavioural competencies that we're looking for. So, problem solving, action orientation. We don't do an EQ assessment, but we do assess interpersonal skills and, and their social connection and communication skills as well. So, if they display strengths with respect to those key behavioural competencies and an above average technical competence, that is what would be a measure of success.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Yeah. What are the advantages? it gives us, well, certainly the technical assessments and behavioural assessments give us an objective view, a more objective view of the individual's competence and capability. CVS and telephonic screening and panel interviews by nature are fairly subjective. We're able to compare that information and insights to what these more objective, mechanisms are telling us. And how do they align.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: I look, I don't think, I think it adds quality to the outcome. The only disadvantage that I see is that it's a lengthy process. It lengthens the recruitment process, and it's often a complaint from line. I think that as much as the, as much as the assessments are, or standardised, and, there may still, it's all done in English. They could still be a, if you're really not proficient in English, it could have a disadvantage, but by and large, I mean, most of applicants speak fairly fluent English.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: No, I think we've been lucky in the sense that, it's all worked out in terms of the technical ability. I think what, as I say, we don't assess IQ, not IQ, sorry. EQ and maybe it's something we want to consider as part of the assessment battery, because I think what may have, what things step in some instances, but not many is the people that young graduate struggled to integrate into the organisational culture. Also, so the organisational culture, but then also just, the world of work. And, and as much as there are many support programs in the, in a graduate program or in a junior role, the induction sessions and various other, training programs, non-technical training programs. Some people still struggle because we are corporate at the end of the day. We are IT, IT business in a corporate and some people just don't enjoy don't actually fit into a corporate.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: They all these, we have a centre of expertise, organisational design centre of expertise. The role profiles of, are created by the business unit, HR individuals in conjunction, and then, validated, through the org design centre of expertise. And with line managers input as well.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: So, when say characteristics, are you talking behavioural characteristics?

INTERVIEWER: Either, any.

RESPONDENT: So, look, I think in terms of the technical requirements for the role, it would, based on what the focus of the role is in terms of the characteristics that relate to the business culture, that will be determined between the line manager and the HR business partner, or the manager. From a behavioural competence point of view, that would be your HR business partner in conjunction with our, assessment team at the group level, just depends on the HOBPs qualification, if they have an organisational, psychology or psychometry background they able to, from the job, the role profile, we're able to pull out what the key competencies are, and then get it validated with the line and with our assessment COE.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: The line manager will determine which technical assessments need to be done. The HR business partner, in conjunction with the assessment specialists will determine which behavioural assessments. In my case, I am a registered organisational psychologist. I don't refer to our assessment specialists because I mean, I had initially, but I know what battery of tests we use. I'm able to then align it to the role and the level of the role.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: HR has to ensure that, we very much, we were not doing the recruitment ourselves. We the liaison between the recruiter and the line manager. It's about, creating context for the recruitment specialists, and interpreting what the business need is when we're looking for juniors or graduates. And, and as I say, in some instances, we also involved in the recruitment panels.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: As I said earlier, the line manager will do the technical assessments., will agree on the technical assistants and then HR, or the systems group assessment specialists will determine, behavioural assessments.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: No. The, the assessments are linked to the level of the role. So, certainly the behavioural assessments, and this is directive from our assessment centre of expertise, they've already identified for roles at certain levels. These are the behavioural assessments we use. For more senior roles, these are the assessments we use and then the line managers will determine the, and similarly the line managers have, designed the technical assessments for the appropriate role levels. Be it juniors or graduates, juniors, intermediate seniors would have separate different, assessments.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: There are obviously, there's lots of coaching and support that happens. They do get given, a training program, and there are monthly engagement sessions and the mentor, and, which is usually the line manager. And, they get a monthly reviews against the outputs for each section or module, that they learning. It's almost like a revised, performance contract. It's not a, it's not a hard and fast performance contract, but it's obviously, there are learning pathways that are designed. Within those learning pathways, there are modules. We know what the output are, for the, for each of the modules. That's the monthly feedback loops that they have.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Yeah. Yeah. It's, as I say, it's not a formal performance contracts, but the, it's not a formal form of performance contract, but as I say, the, within the learning pathways, there are outcomes that are pre-determined and so they are no strict measures, as we know it in a performance contract, but they are reviews around whether it's a strength or a development area, or what elements of each section they still need further development on or their development is in progress or their knowledge is at an appropriate level. It's obviously assessed through the application of that knowledge in pieces of work that they do.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: The graduate program, and we don't have graduates at the moment in the Company 1 space, but we do in the broader Company. The graduate program is for a 12-month period. And, and obviously through these monthly feedback sessions, it's obviously an indicator of how the individuals are succeeding or not. If there is a trend that is, or rather a, well, I don't want to say a negative trend but if there is a trend after the first three months that we can see the individual is struggling and additional support is being provided and they, and they still not on par with the peers or meeting the output standards, then we would have to have conversations around, how do we further develop them. We may even bring in our employee relations consultants in group and get a view around what are our alternatives, is it an incapacity issue? And if it is an incapacity issue, then, we might, we may, if possible, try and source alternate, an alternate role or work for them.

Otherwise, they have to then be, they go through a formal incapacity hearing and, well, the outcome being determined in that hearing.

PARTICIPANT 2

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: What skills are lacking, so let me just clarify when you say a graduate that's a person that's come fresh out of university or whichever institution and has not had any work experience, is that correct?

INTERVIEWER: That's correct.

RESPONDENT: Ok, so what they typically lack is that work experience, that environment, you know the, how to typically behave within a workspace. About 2 years ago, maybe 3 years ago, I got a group of 10 graduates and kind of behaviours that came out of that was strange at times so definitely, you know, the ability to understand that they within a certain environment and therefore (have a certain) behaviour in that space, professional behaviour. (Technically though), because they are graduates you don't expect them to have a high technical ability. I define that if they are not able to comprehensively start working towards anything without going through some extensive training and that's exactly what the 10 graduates (did a few years ago), so coming out is their behaviour in the work environment and secondly they don't come out with that exact skills of knowing how to create end to end systems as yet.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: Well because they are graduates you also don't expect them to have a high level of engineering experience right but a quality graduate to me (is somebody who) actually had some sort of internship, 6 months in a environment or work environment where they are able to understand, you know, the delivery cycle and what it typically means to deliver a product and that not only includes the technical aspects but like I said, also the behavioural aspects. HERE the behavioural aspects are a lot more important to me at least upfront because technology I can teach but behavioural is a bit more difficult.

INTERVIEWER: So when you speak about technology, when you speaking about behaviour, are you speaking about the soft skills, that type of thing.

RESPONDENT: Yes, it's the soft skills. Its little things. Comes down to workplace etiquette in the end and when you working as a team with software developers they often work within a team and that often means that everybody has to play by the rules and when one person doesn't play by that rule then the team is thrown out of sync. Things like being on time or to take on the responsibility or accountability for when your work isn't getting done on time (so there are different rules) let's say for getting stuck on an item after 30 min getting old of a senior so that that work doesn't get stagnant and you can get back that

movement, so its little things but they mean a lot. Also in terms of time management I find that the graduates, and I don't know if it's when they are at university, they have autonomy to run off and do whatever they want when they want but coming into the workplace that there is that understanding that there is a specific amount of time that you have to work and that always is a problem especially when you working with people who smoke, you know, time management is a big issue as well.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: Ok, so typically when I look at a graduate, the one thing I want to see is a passion for learning. In the tech industry if you cannot update yourself, you cannot learn, you won't succeed. The technology workspace, it expands so quickly on the, no, I can't even say on a year to year basis but within 3-6 months there is a new type of technology and if you want to move along with the market in terms of delivering then sometimes the companies have to adopt those technologies very quickly. That also means that when you looking at employing people you want them to adopt them equally as quickly in terms of learning. So a passion for learning is one, critical thinking is another, the ability to look at something, understand that it doesn't typically (???), try a different approach and sometimes an approach that hasn't been taken before. Then the last thing would be the ability to actually, that empirical process that you've executed a piece of work and that you've got feedback on it and then taking that feedback and what's making that work better. So that whole process of reviewing with the peer-to-peer system.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: So definitely critical thinking is top of the list, I've actually, you know in that group of 10, I've actually had 2 chemical engineers who hadn't learnt one line of code at university but through identifying the ability to pick up something and learn very quickly, the ability to think in a critical manner and obviously logic follows that, they actually were 2 of the best developers coming out of that process.

INTERVIEWER: Wow.

RESPONDENT: And I suppose you going to ask later how I test them and I'll leave that for then because when you talking about looking for people in a field like engineering, chemical engineering where there is no understanding how to write one line of code, you'll understand what you need to look for when you do ask them to write an assessment

INTERVIEWER: So you mentioned critical thinking. Is there any others skills that you think is very critical to the graduate when they move into the software dev position?

RESPONDENT: At a graduate level I would say that is it, critical thinking and logical, ability to think logically, ability to have that continuous learning and improvement process, and that's it, that is the fundamentals of every engineer that walks through the door, regardless of their title or years of experience.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: So, sorry just give me a moment. So typically the first step is to have a one-on-one conversation, I typically do about 30 minutes, I introduce the company, our values, out technologies, how we typically work. Once I've done that, I give the other person the opportunity to do the same. Now when we talk about graduates, they can't speak about work experience but they can speak about their experience of learning and the kind of projects that they worked on and how learnt and applied through that process. So that initial conversation would be different in that way and like I said, one of the key things I look for, you know what, in fact, one of the key questions I ask is "Do you go home and write your own applications?" "Do you read books?" "Do you subscribe to learning channels?" "What's your mode of learning?" Those kind of things right. Once we pass that phase and I get to understand the attitude towards that, learning as you can hear is a very important thing so once I understand the attitude towards learning, I then look at the aptitude to be able to do the job right, and then that next step then involves an assessment. With graduates what I would typically do is I would ask them to write a pseudo code assessment, something really stupid, something really simple like "You have the number 5, if you subtract 1 how would you get the answer?" I would ask them to write it out in plain English how they would typically do that. And with that pseudo code I can still see and assess logic, I can still assess how they will typically work through a scenario cos once they've submitted that assessment the next step is to work with them and kind of do a code review process even though it is pseudo code you can still understand that input statements like if input = 0 then its invalid you look for thought qualities like did you put enough thought into thinking what would happen if you put in an alpha. Those kinds of things. Once they've passed the pseudo code they get that particular feedback from the interview which is obviously myself then I would ask them to if they did come from a software engineering degree of some sort I'd ask them to write an application. In the case of the 2 graduates where they didn't do any computer engineering, attempt it, and it was still fruitful, from that I could see that from my initial conversation with the pseudo code, the kind of feedback was applied, whether they took that and applied it and made it better and that process of coming back to reassess and work through it, you know if they chose not to apply the feedback the question would be why. You know, and if it's a good enough reason then good and well but you get to a certain point where you realise sometimes people just don't want to try, that then talks to attitude right? You can pick up lots of things in that process, in that particular screening process. It's a process that I actually apply to all roles, even senior roles, obviously I don't start with pseudo code then, I start with the normal development or coding expectation. They all get the same test regardless of their level of experience.

INTERVIEWER: So when you say they do the pseudo code, you mentioned that they just write on paper?

RESPONDENT: Yes, or they can submit it via electronic media, it doesn't matter.

INTERVIEWER: Ok and then, once they are done with that, do you then give them, based on their answers you give them another piece of code to write, but this then is actual code?

RESPONDENT: No no, the assessment type is still the same but the next step is, try and make, try and write as best you can code to reflect that.

INTERVIEWER: Ok

RESPONDENT: Right?

INTERVIEWER: And from there you determine whether they fit or not?

From there yes, a big big contribution to determining whether they fit or not is that feedback loop, whether you know if I say perhaps you should not look at using a while loop, perhaps you should use for each, for whatever reason it is for whatever reason. If they come back and they still don't do that if there is a good enough reason as to why they shouldn't be using a type of recursive method, then you know that in the workplace and in a team environment every day you are expected to write a unit of code, submit it, have someone review it, that feedback and then make it better based on that feedback. It's a huge component of writing software. If you don't have that ability to understand that feedback is important and not make you better, it's a dual aspect, writing code, everybody is responsible for that code base so we often say that, when you look at a code base you should be able to pick up a person, one person's particular style and that's why we look at coding styles and practices right? So typically that is it.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

RESPONDENT: So this is before they actually get offered a role, is that what you asking?

INTERVIEWER: Sorry, say again?

RESPONDENT: Is this still part of the screening process?

INTERVIEWER: Ja

RESPONDENT: What will help me decide on a particular person?

INTERVIEWER: Yes, (So you mentioned earlier, based on the feedback, that the only success factor or indicator).

RESPONDENT: No there are other things right, I mentioned that there are 2 key criteria areas that we would look at. The one would be a typical kind of attitude, so how do you conduct yourself in an interview. Are you (????) are you playful, do you aim to high. You know sometimes they come in, the one guy that I interviewed, you know, after a few questions, his next question was "How can I become a manager?" You haven't even started your first job and you want to become a manager. So for me, for that particular purpose, I look at in terms of being realistic, if they were to come into the workplace, would I have an

issue with this person, trying to, bulldoze his way through the process without taking up that process of internship, of learning and those kind of things so the behavioural aspects are really important and the technology are important but like I've said before, technology you can teach. To me, it's more around behaviour. Can you be moulded. If we take you in, I'm not saying you have to be sheep, you know whatever we tell you to do you do but you have to be malleable, you have to be, like I've said before, take on that feedback and use it to grow within the organisation.

INTERVIEWER: And learn, like you said, be willing to learn, like you said earlier. Ok, great.

RESPONDENT: Yes, that's the absolute key, it's that passion for learning but not only saying you have a passion but demonstrating it. Do you go home and code, do you (tinker), those kinds of things.

INTERVIEWER: Ok

RESPONDENT: You cannot say you have a passion for something and you don't find yourself immersed in it. It just doesn't work out.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company??

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Well, you know me right, and you know that I'm the famous oracle and that I always have a plan in place when I start working through certain things. I'm just referring to the instance of these 10, on boarding these 10 graduates, it's actually a huge (feet) to on board 10 graduates so obviously I have to have a good plan in place

INTERVIEWER: Sorry, I didn't get that. It sounded like you were mumbling a bit.

RESPONDENT: Sorry, just repeat your question again.

INTERVIEWER The advantages of using these screening tests.

RESPONDENT : Ok, so the advantages of using the test is that it allows me to have that early indicator of a person's potential based on how they demonstrate their passion to learning, their ability to receive feedback and apply and wit that, I was saying, in the instance of the 10 people, I had gone through that list, Id interviewed 30, 40 people, maybe even 50 people at that time but I would, eventually I would be ranking them according to that criteria: behaviour vs tech, etc. Willingness to learn and all those things and I can tell you that, in the 2 or 3 years, some of them have left us already, 2 or 3 years that they were with us, the people who were at the top, you know, based on that assessment consistently moved in that way, in fact one of the guys moved from being an associate to being a senior software developer in 2 and a half years and he was actually on top of the list. And so with that, I know we shouldn't be ranking

people but with that ranking I was able to assess exactly what you asking, how effective was it and it actually proved to be really effective because the people down lower were the first people to leave.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: I think, the use of screening tests is an absolute must. There can never be a disadvantage, I suppose it depends on the type of screening that you would do and that would to a certain disadvantage but I think if you have a good approach to it, a standard templated approach to it that you can use over and over again and you can look at it objectively compare then you shouldn't have any disadvantages to having a screening test. You know right now I'm interviewing for very senior roles and some of them actually refuse to do any kinds of tests and I simply just retract from that candidate and the conversation. There is just no way that you can, in the world of software engineering, showcase or demonstrate your competency without screening processes

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: I have 10 people to look at and assess the question, technically, we upskilled and got them to a very very high degree of competency where often we find they get poached which is a problem because the manner in which we encourage our juniors to learn and with that, it means that, sorry, just rephrase that question again Sonja.

INTERVIEWER: So I want to know, has the results of the testing ever been incorrect resulting in the employment of the unsuitable graduate or the other way, you don't.

RESPONDENT: In terms of incorrect, no, no it hasn't but remember I have a ranking system and with that ranking system I have behaviour and technology but what I did find is that it was far more difficult to correct or mould that behaviour than it was to do the tech and so the screening process in terms of the technical ability is not an issue, the process in terms of behavioural aspects is more of an issue. It's kind of a 50 50, you know, what I found was I had people that could do the job really well but had terrible behaviour, behavioural characteristics. That then takes away from your space as a manager because you should be spending your time elsewhere but now you are correcting bad behaviour.

INTERVIEWER: So, have you ever, after doing the testing, employed someone or not employed someone that you should possibly have employed?

RESPONDENT: Well its quite difficult to assess that one when the person isn't in the space. Like I said, in that process, I probably interviewed about 50 people but I do believe the 10 people that I did end up with were the correct ones. So I typically would not have selected them if I didn't find them fit for purpose

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: So within my company, I typically do the job descriptions for the roles.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: So in our company, I typically work with that (particular lead and I understand with) that person and the people and their (personality that they could typically work with right,) but in terms of identifying characteristics, its everything I said before, all the things I mentioned, continuous learning, feedback cycles, passion those kinds of things. Those are actually our imbedded values. Those characteristics come out of our value system within our technology space. So it's not defined per say but if somebody doesn't have that they simply won't fit.

INTERVIEWER: Ok, I understand. So where did you source these characteristics from? Is it years of experience or do you see their fit because of culture with those you working with or the culture of the company and whether this person will fit. Is that how it is over there to source the right type of person?

RESPONDENT: Yes so you know, I've been in the industry for about 20 years, and of that 20 years, I was a developer for about 15, maybe. Just recently I moved out of that but I've had the opportunity to work as an engineer, as a scrum master, as a project manager as as as , in terms of understanding characteristics you would need as a developer specifically a person who is going to work in a team, you get a sense of, when you speaking to a person, knowing the rest of your teams components, how they would fit in and it can vary quite a bit, like I said earlier I am responsible for Cape Town and Lithuania and a few guys in the UK and within those environments I look for completely different things so because of the culture within those countries.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: I like to keep it inclusive, I make sure the software engineers are part of that process and from time to time we do change our assessments but that's all done by working very closely with the team. It's also geared around the current technologies that we find ourselves immersed in. Previously you could look at somebody creating an MVC app or something, now you looking at Microsoft services that needs a different architectural patterns and toolsets and so it (ensures) that you have to evolve that assessment criteria.

INTERVIEWER: So you have your team involved basically, so it's you and the software engineers?

RESPONDENT: Yes, so I'm far removed now from the technical space in terms of toolsets that we currently use. It's been a while since I've touched a line of code. So what I do is, I typically rely on them for that technical aspect and on the behavioural aspect, I hope to think that I have good enough judgement on how to get through that. I do however (rely the opportunity) to get to the other software engineers to assist in the process to understand that to coaching them for the future to take up a similar role where they'd have to look for the same characteristics.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: So HR would typically get involved, so let me explain, my screening process is a 30 min session who am I who are you do you think we can do this. The next step is completing the technical assessment. Then after you complete your assessment because it's actually reviewed by the software engineers then we move on to a 1-hour interview and that's typically where the HR gets involved. So from their perspective they typically look at the same parameters I do, more specifically behaviour, will the person fit in the company as a whole, they are also very good at understanding how people should typically move through career paths and should pick up anomalies I that space as well and ja, so typically that's what they would focus on more towards the cultural aspect, making sure that (the person) not only fits into the team but the wider environment.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: Who decides which tests?

INTERVIEWER: Yes, which tests are done are done by the graduate?

RESPONDENT: There is no choice, there is always a test and it's the same test, the test is designed to be very simple and we would give it to the graduate and the most senior software engineers and the reason for that is with your years of experience in software engineering you'd understand that you can apply certain patterns and practices, design principles and architectural patterns and kind of things so you can see the level of maturity in those tests and so we typically have one set, one test the full team decides what that must be and that is delivered to all candidates

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: Absolutely.

INTERVIEWER: Across the board, so whether you come from CPUT or UCT or Stellenbosch, same test?

RESPONDENT: The same, exactly the same.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: So once they employed, you know every company has their own toolsets they would use, in our case it would be the Microsoft stack predominantly but that also means when you go to different organisations and you say Microsoft stack it doesn't typically mean the same thing either. So one of the first things we do is we set them on a 6-week program where we introduce them into our delivery space, you know our agile delivery, our toolsets, our environments, those kinds of things right. Within that period, they are expected to write a little app and mimic the process of typically working together as a team and within that process they are continuously assessed. They get assigned mentor's and within that mentoring process when they write a line of code, when they write a block of code or whatever it may be, they can now check it in to be reviewed by the mentor. That mentor would then have a look at that block of code, provide that feedback cycle and expect whatever changes to be done to be done right? That's all part of the assessment process within those 6 weeks. With that we use the agile delivery method, we use scrum, we are able to see in terms of responsibility and accountability do you typically ensure that your board is always reflected. So remember when I spoke about behavioural aspects, within that 6 weeks is a good enough insight as to after that 6 weeks what we need to work on with those candidates. With that then we have to move on the objective settings within the probation period we meet (once) a month, we use the exact same review criteria as we typical do across all software engineering so on a monthly basis you'll be assessed so you look at different facets, so on the behavioural side, give me sec, let me just open up something so I can give you specifics, do you want that?

INTERVIEWER: Yes please.

RESPONDENT: Ok, so give me a moment, so I've mentioned before, behavioural vs technology, in behaviour is, give me second I just have to find it, IM opening it. So what we look at in behaviour are things like, it's still opening, give me a moment, so like I've said it's the same evaluation used for all for their annual, bi-annual review so from the start they get treated exactly like everyone else with the same expectation and the tests are measured by the same set of parameters so with behaviour and technology we typically look at the things like you know in terms of the level of competency are you a novice, are you intermediate, advanced, an expect. We have different categories or definitions that describe all those particular skill levels right, so a novice in my opinion would actually be tied to a graduate because they've had no prior experience ad that would mean that they gain that experience on the job, that they require a lot more assistance from a senior on a regular basis that they can work towards understanding the terminology behind those principles, those kinds of things and not necessarily apply it immediately but do so over time right, so if we look at behavioural competencies we look at accountability ad dependability so remember I said that we have that 6 week process, delivery process with the agile part of it, accountability and dependability can be something as simple as when the stand-up starts do you have to be reminded to burn down your hours or do you have to be reminded

that your task is still sitting in to-do, those kinds of things, right? On top of that though you have, every day you have a certain, you have 8 hours, typically a task should not last you longer than 8 hours. If you don't complete that right, there's dependencies further down the line with other people, that means for accountability and dependability if you haven't reached out in good times cos you having an issue of some sort then really, are you accountable, are you standing up and saying I need help or not. So we look at other things like adaptability and flexibility and that's all steered around that empirical process of that feedback cycle, attention to detail, focus, growth leadership. So as a junior are you able to reach out to other juniors and help. It's something very simple but what it means is that if you can pick that up earlier then you can also see who your strongest seniors are going to be and the people who need to grow and if you look at succession planning this comes into play. Then we look at problem solving, critical thinking, those kinds of things on the technical side we (define) it as the functional side. The part where you deliver something we look at agile practices, architectural coding standards, quality standards, deployment practices, design, database practices, those kinds of things. So it's quite a few areas that we assess them in. It's quite comprehensive but its specific enough to understand from a behavioural side and a functional side and technical capacity that you have that balance on both ends now like I've said before, to me, for me the first 6 months of a graduate, I want to get them to behave in a certain way, thereafter once I know their behaviour is there, their passion for learning, they go on it, they learn it, they do those kind of things then we work more steadfastly on the functional side of growing that technical skill.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Absolutely

INTERVIEWER: And is there a training/development program setup for the graduate? You've kind of answered the question already but just for the sake of asking all my questions, I'm going to reiterate the same thing, so are there various factors in place to measure the success, post-employment of a graduate and are there training/development programs setup for the graduate?

RESPONDENT: Yes, as part of the process of the monthly review, I've mentioned that they are ranked with a particular level of skill so you can be a novice in something or intermediate in something or (expert) right? And typically what we work on is a novice equates to a skill level of a 1, an intermediate equates to a skill level of a 2 and a 3 equates to advanced, so typically with a graduate, we want them to be working at a level 2 or 3 right and if they are not working at that level we actually put a serious focus on that areas that they not doing so well and set objectives therein and that means on that month to month process of evaluation we can get them towards elevating that skill right but elevating that skill obviously means that they need to go through some learning programs. We actually have an in-house trainer that we work very closely with who typically sets up training areas for these guys, it's not only for graduates but for any engineering candidates who walks through the door.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: So I actually had a recent scenario around that, that person wasn't a graduate but he was an associate which means he would typically have 2 years' experience and he didn't, he went through the process I was talking about, the 6-week process, going through delivering a product. Once I embedded him into a team I quickly realised that there was issues right but also but with that the process of the monthly review, working through the steps of taking your 1's and making them 2's, taking your 2's and making them 3's, if that isn't achieved and its very specific, its actually tied to work items and its clear to see whether you've done your job or not right and with that month to month evaluation and that objective setting if you not reaching that then we work very closely with you, it's actually very difficult to fail and if you do fail its simply because you not cutting it. In the instance of the person that I recently worked with, I actually gave him quite an extended period of time, I actually gave him almost 9 months to try to get himself ready ad he was technically strong actually and even though he was technically story, he couldn't deliver in time, he missed some of those key factors in terms of accountability and dependability because often his work would be very very late. In one instance, as part of his evaluation, that we speaking about right now right, how do we typically work with that process he was supposed to deliver something in 3 days, it took him 2 weeks and then when we talk about accountability and dependability then we talk about flexibility you know he should've been able to turn that around though various measures which our seniors putting in various things in place like reaching out and learning, you know, those kinds of things.

INTERVIEWER: So the same process as you mentioned now will be applied to the graduate. So you'll identify their lack of skill and then you'll work around it and once you've now worked around it or tried to improve it or rectify it and they still don't make the grade, what do you then do.

RESPONDENT: Then you start working towards a poor performance factor and in this instance it was hard because he was technically strong. One of the things I, I wanted to be very objective, so what I did was I actually asked him to complete the recruitment assessment for me. I took it and sent it to 3 guys, I sent it anonymously, I didn't say it was from him and the feedback we got was that his got good qualities and practices, his coding standards, he is a good guy right even though he could do the job technically there were just other areas you can (lend) to. It's one thing being technically strong, but you can't take a year to do something which should take 5 days. Know what I mean.

INTERVIEWER: Yes, yes, I hear you. So now we are done with our interview, maybe if you can stay on the line I'm going to end the recording but I do thank you very much for your time, I really appreciate that you have taken the time to help me with my research so I really thank you for that. I'm going to stop the recording and then I want to chat to you.

RESPONDENT: Sure.

INTERVIEWER: Ok, thank you.

PARTICIPANT 3

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: I think it's, well I don't know exactly but in my opinion its, when I was a graduate looking for a job, what I lacked was, I had a lot of fundamental knowledge from my studies and my studies was very low level, so I learnt kinda the inner workings of how things worked but I had no idea how to use high level frameworks and implementations because they change all the time especially in software engineering where it's so dynamic and the landscape is constantly shifting, I didn't have the knowledge about the high level stuff which is what most companies are looking for. Most companies need you to have high level experience. The low-level stuff is not as important on a junior level but the high-level stuff is a lot more important. When you become more senior, the low-level stuff becomes more important because it helps your ability to problem solve but when you are a junior developer or engineer, if you can look at the high-level stuff and work within the high-level workspace and lean on your seniors to fix the low-level issues that is out of the scope of your knowledge at that time. I feel that my university experience was a little bit backward, I should've learnt more high-level things.

INTERVIEWER: Like what?

RESPONDENT: So for example, we use a lot of software frameworks, development frameworks like Googles angular JavaScript framework and I had some experience using some plain vanilla JavaScript which is the low level version of the language but angular is a modern very high level implementation that uses a lot of modern concepts like dependency injection and various types of techniques and design principles so you implement inside the angular framework rather than writing raw, bare metal implementation. So, I didn't even know, out of university I knew what JavaScript was but I didn't understand what a framework on top of JavaScript was, even how to use a framework on top of JavaScript and how that kinda translated into JavaScript.

INTERVIEWER: Ok, is that the only skill you think was lacking?

RESPONDENT: Thats one of it, the other is, I didn't feel my university or my studies prepared me for the non-functional parts of the job like organisation in your workspace and how you organise yourself and how you communicate with other people. Communication was severely lacking within my university degree. It's a huge part of software engineering and how we communicate with different components and different people within the job space, it's very important and not something I completely understood. I think I'm just a confident person in general so I picked it up relatively easy but for people that might not have the kind of confidence that I do I can see it will be a lot more difficult to adopt that kind of process.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: A quality graduate, that's a difficult one. For software engineering there is just a spectrum of what makes you useful to a company right. On the one side its being technically able, you know to adopt technologies used and implement them. It's the guys who are really good at mathematics, thinking logically and rationally and on the other side of the spectrum is your inter-human communication skills, how you interact with other people and how they understand what you saying. Software development is a team sport essentially so how you act in a team is very important so someone who is leaning towards the middle of that spectrum, who has technical ability but also has some personal skills, communication skills, that type of thing. I think that would be the ideal space. Obviously, people are not, it's not going to be very static. People are going to range within that spectrum, some people are going to have more communication skills, others more tech skills. Everyone has their place in the organisation but I think to b, from an organisational perspective it's easier to work with someone who has both the technical skills as well as a little bit of the communication skills rather than extreme ends of the spectrum.

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Critical skills would definitely be an aptitude towards technology and maths. You would need a core fundamental, it's not important for it to be extremely deep but you have to be able to think logically and reason critically. So critical thinking a fundamental knowledge of how computers process instructions and critical thinking I think that's kinda the core skills. Communication is something that can be developed over time. It would be ideal if you had communication skills going into the workspace but I think that is something that can also be developed over time as you interact with people depending on your personality type.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: So generally, when I went through the interview processes at a couple of places, normal interview at a company I was assessed based on, I had a conversation about what I think software development is and it was just for them to get a baseline of my understanding in the technology space. So that was kind of a verbal interview to gauge where I am at and where the company is at and whether it would be a good fit together and how I would fit into their team dynamics and then there was the technical side where I would write a test of some sort like multiple choice tests or something like that or I would do a coding assessment. Some companies use platforms like hackarank or codeability, sorry codedility as interview platforms where you get given a scenario and you have to write some code in order to satisfy that criteria. So those two tools, hackarank and codedility are used as well as some companies asked for a full spec'd project. They would give me a general problem that the business is trying to solve and then I would need to develop an entire solution for them to satisfy that business need and that would be in the form of writing some code with some coding IDE's like visual studio, visual studio code, atom text editor, so different kinds of IDE's depending on what technology they requested

me to code in and I'll use something like github to store that and give it to them and I would let them see my github profile which has some of my personal projects to kind of showcase my ability.

INTERVIEWER: So, you spoke about an initial interview and then a test. Is that all that was done?

RESPONDENT: Generally, those are the bigger standpoints so the bigger companies split it up into various things. Some companies have a quick phone call interview to get a rough baseline to understand your experience and where you came from, like what you looking for and then there is a more formal interview where its more face to face or like a team's meeting or something, a little bit longer, more formal and then you know sometimes the HR would get involved to understand like how that person would interact from a company perspective and the development managers would get an idea of how that person would fit into a team and then there would be a technical leader or software architect who would assess the technical abilities of whoever is interviewing and after that you would get the assessment to make sure that your coding standards and practices are up to scratch and you not just talking a good game in the interview and you can actually implement that and then after that it's just more the nitty gritty met information of getting your details and being inducted into the company if you were successful. So, its approval gates at different processes, you can get rejected at different stages, the phone call stage or the interview stage or assessment stage.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Well, I think it gives companies a better perspective of what they can expect from an individual. You can never really say for sure what someone is going to be like and how they are going to work, in terms of their work ethic and their skills and their actual technical ability. You know there are ways to cheat on the assessment and so someone could cheat on the assessment and just talk a good game. I think the assessment and the interviews one on one is a good way to filter out people that won't fit into the company based on as many aspects of the job as they can measure. You obviously can't measure all aspects of the job but I think what you can measure can help filter out applicants that might not suite the company.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: Disadvantages, there are no disadvantages to screening I don't think or not from what I can see but I do think there are disadvantages in how those screening techniques are implemented for example you could write a test or you could set a test that doesn't really assess someone's knowledge about the things you looking for or the interviews can be a little bit too subjective in the sense that I might gel well with the particular manager I'm talking to but I might not gel well with everyone else because you know, we might have conflicting personalities. Within software development there is a range of different personality types and it's not always easy for all of them to get along and that's important from a team perspective so that's potentially a point of failure in the screening process. I don't

see many disadvantages of having the screening process, I just think that sometimes screening process might not be very well implemented.

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: When I started, the company had the expectation from me was that I am a graduate and I obviously didn't know much so my skills weren't 100% yet and they needed to be developed so initially when we got brought on, we did a kind of induction project. It was a small project to test our skills and set us up for ways of working in the company so not working on any vital systems the company is using so nothing client facing or even internal stakeholder facing. So, what we did was a parking application for our office. So, our office has limited parking and so if someone takes leave then someone else can take their parking for the day or something like that so we made a kind of parking booking system as our introduction project for the job and then from there, so our skills were assessed by the leads. Our technical skills were assessed by the leads from start to the end of that project where we obviously learned a lot. You can assess how fast someone is learning and how well they are picking up the technologies and they obviously just fed back to management on where we should be placed and how we can contribute to the company and from there it was a normal kins of assessment criteria for a software engineer about how much work they deliver from period to period. We work in sprints so 3 weeks of work and then we stop and we iterate in that kind of model. So, at the end of each cycle, we would be evaluated on how much work we delivered in that sprint and then we would have performance reviews based on that, annual performance reviews.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Yes, from my previous question you can infer a lot as well. That induction project was a lot of learning and upskilling us into the technologies that are maintained by the company so for example I didn't know angular or .NET core which are two of the major frameworks used by the company. So, in the project we used angular and .NET core so in that introduction project, the parking app, it gave me more context into the technologies and frameworks that Company 2 uses so I learnt how to use those frameworks and I learnt how to work within those frameworks and by the end of it I had a pretty decent knowledge enough to then work on applications for the company and then after that, the indicators on how I was performing would be feedback from my leads to the software manager. So, for example how my lead would assess my contribution to the team, did I communicate effectively in the team, did I contribute valuable software, did I follow formal processes, was I reliable, accountable, responsible, all those kinds of metrics that are attained as well as stats are measured from various tools that we use. So, we use tools to facilitate our development and to manage expectation to various

stakeholders for example how fast we can deliver pieces of work, bits of software and contribute towards a goal and how fast we approach that goal. So, my performance was also measured based on how well I could keep up with the pace of the team and how actively I contributed which is all measured by certain metrics which are pulled from these tools so for example, how many hours I spent on a simple task or how many hours I spent on a complicated task. Those metrics were captured and also used to baseline my performance.

INTERVIEWER: So, when you say capture time, do you use Jira?

RESPONDENT: We use Azure DevOps which is a similar kind of tool so you create boards and you create chunks of work items they are called, then you split that work items into tasks and you assign hours to those tasks and if I can consume 10 tasks of an hour each then I've completed 10 hours in a week of actual development which is actually an indicator of how much I can consume in a given time, someone else could do 20 hours of work in that same week, another person might only be able to do 5, so it depends.

INTERVIEWER: So, do you think that was your training and development after you started?

RESPONDENT: So, the software landscape changes and shifts so extremely quickly these days so you almost never done learning so I think that that training project got us up to speed, got us into the market but we always have different training protocols that we run through to keep all the engineers, even the leads and architects and whoever else is concerned with it up to speed with the latest trends and technologies and the newest technologies coming out: how to operate within them, how these new technologies can influence your technology landscape and your technology architecture so we constantly get training on what's new in the industry essentially and we have the opportunity to upskill ourselves where we find deficiencies in our skill set so I might not be particularly good at angular but I might be great at .NET core so I have the opportunity to request training for angular to upskill myself or I can do it myself depending on how I want to go about it but the company is very supportive of people wanting to learn more and upskill themselves.

PARTICIPANT 4

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

INTERVIEWER: Ok, wonderful. So, you are my right guy that I need to be interviewing. So, my first question is what skills are lacking when graduates enter the workplace?

RESPONDENT: So initially from my personal experience, I think I lacked a professional, just a way of interacting professionally. I think in varsity you are interacting with friends; you are interaction with people you know you can speak to however you want to but then for me one of the first things was just seeing how you can't interact always with co-workers in the same way. That was a skill I had to learn, got burnt a couple of times, when you a bit too casual and shouldn't be but that is something which I learnt fast but I didn't know beforehand and something I wasn't told really, wasn't told how to interact professionally in a sense, besides from a course on varsity where we had to write cover letters and stuff but there wasn't like the soft skills. So, in terms of, I think, when I left varsity, I didn't know, I knew the technical skills, in a sense, so I knew how to do those things but I didn't know how to apply them like thinking through a problem and applying parts of, for me in varsity the question asks you something and so you answer it, like that, it's a lot more critical thinking in the workplace which I don't know if I got enough experience in varsity for.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: What is a quality graduate. Someone who is confident, I think confidence in your ability even though you I felt out of my depth a lot of the time but I noticed I was with a couple of guys who started at the same time as me and some of the guys shined because of how they took on tasks. They were bold, they didn't stop I think, asking questions is one of the biggest things for people who don't, who are new and my personality isn't one that asks a lot of questions. I try to struggle through things, even today I was working on a problem where I was spending a whole day on it, yesterday and today and I was still down a rabbit hole and then one of the guys said "Let me help you" and he came and just brought fresh opinions so I do think that someone who can boldly take on work and ask questions and not be scared to do that and also ask questions and be inquisitive. It helps the employee as well as the employer, so it works both ways, I'm sure my manager really appreciates it when I ask questions, ja, so I'll say those things.

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Critical skills, I think, ja, I think problem solving, ja there is a difference between knowing things technically and knowing how to do things, knowing how to program and knowing how to

solve problems. I think it's easy to, if you don't have the technical knowledge, it's going to be tough to try to solve, it's like asking a question but you don't even know what to ask. If you know the technical side but you can't think then you in a situation where you do what I did and still do actually when you can tunnel focus and tunnel vision into something and not take a step back and look at the problem. So, problem solving, I think team, it's a skill you do need to know how to work on a team and have that sort of emotional capacity to not be too closed off. I think being a good team member is really helpful. I've seen some people who thrive in a team and others who just, ja, you can see they just don't like to be around other people and just focus on getting it done themselves which isn't very helpful in a big company.

INTERVIEWER: Nor in our environment, in the agile sphere, you can't be. Ok.

RESPONDENT: Absolutely, ja, you need to be a team member.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: So, I'm trying to think. They screened us, the way they did it was: they sent us an initial, it was a very simple coding problem which they asked us to solve. They basically said, wait what is the first one, so the initial was a coding problem that said basically, "Write some pseudo code, like some code that would do some simple arithmetic problem like "Find numbers greater than 5". I think it was that simple and the idea of it wasn't to confuse you about languages, coding languages or anything like that, it was just to see if you are able to think like a programmer, are you thinking critically are you thinking about not just the one positive happy parts solution or are you thinking about all the negative cases and all that stuff. I think for me I got a bit confused about how simple it was and I was like is this all there is but when I got, when they interviewed me and showed me my solution and went through it with me it was clear that I did miss some things in terms of, ja, like thinking of the different scenarios that a person could take and all that stuff, so that was quite interesting but that was kind of the first interview and they also did a general "What's your story, where you from, why you want to do this etc. etc." I guess those are more emotional qualities interviews where they kind of sense you as a person.

INTERVIEWER: So, they gave you pseudo code and then they did an interview

RESPONDENT: Yes, I think it's fairly standard. Half of the interview you do a technical bit and the other half. For us they gave us a week to do the thing and then we went through it during the interview.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: I guess it's to, you got to somehow reduce the candidates that are applying, like you don't have the capacity to interview one hundred people face to face. You've got to have some sort of way to drop that number and I guess there are a lot of ways to do it but ja, you've got to find the balance as well, you don't want to bring a problem that, well a screening problem that really only gives you a certain type of person. So, for instance if they gave me a very complicated piece of algorithm to make or whatever then they probably would've only seen the people who were very technical but not have the other aspects. So, you really need to find that balance and I think it was a clever idea of them to choose a simple solution but one where you can still see the candidates thought processes.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: So, disadvantages, I think you can limit people a little bit. It can limit you in the type of person, so for instance a lot of people out there don't have the technical ability, they don't know the coding side of things but they can learn very fast. You can get a very impressive, as soon as you meet them face to face, you get this sense ok this person is very capable of learning something like a language or a programming framework very fast but something like a screening process might take that person out of the scenario from the beginning so ja, you got to be careful.

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: Can you give an example?

INTERVIEWER: So normally companies have a 3-month probation period where they evaluate you every month or they give you goals, they set goals for you.

RESPONDENT: Yeah so, we had like a standard 3-month probationary period, was it three months or six months, I can't remember but ja I think they gave us that and we were put on small projects during that time. I don't think they had any, they weren't going to drop us, they weren't like, I don't think they were going to let us go but they basically monitored us, we had, I think we had catch ups with our managers every couple of weeks or so just to check where we are and ja I think there wasn't any objectives per say, there wasn't anything they said we had to do, it was kind of like a qualitative, getting an idea if you a good fit or not.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Ja I'd say there are. I think it's a tough thing. I appreciated the way they went about it at my current work, they basically just catch up with you every couple of weeks or your manager catches

up with you. At the beginning of the year, you set yourself some objectives and those objectives are there as a benchmark to see are you like objectives like learning new programming languages or teaching other people or tutoring them or whatever and whether you are doing those or not is a good indicator, are you maybe in some trouble or are you progressing as an employee, so ja I would say those objectives are very good at giving that indicator.

INTERVIEWER: So those were the indicators, was there any training/development so for argument's sake they'll say in six months' time, let's have a look at you, I think you should go on this training or was there a training plan or anything in place or was it learning on the job.

RESPONDENT: Learning on the job for us was more like it, it was more a case of, ja, put on a project, if there was technology you didn't know about, learn it. No structured training but that was from an organisational perspective that as an organisation they didn't invest in too much formal training. We had sometimes where our managers or people, other people in technology would demo things or show us features of programs we haven't looked at before and that would be more like informal and so there was never formal training I guess ja.

INTERVIEWER: And do you like it that way or would you prefer formal training?

RESPONDENT: I think I do prefer it I get a bit annoyed with long stretches of training where it's just a lot of theory like a two-week training program or something. I don't know if there is a lot of value for me learning a lot of theory without seeing it in practice, ja, so I think I've enjoyed the sporadic training and the more the learning as I go situation. I think it's more beneficial.

INTERVIEWER: That's it, that's all I have for you. Stay on the line quickly, I want to chat. I'm going to stop the recording.

PARTICIPANT 5

RESPONDENT: I'm the Engineering Manager at the Cape Town office for Company 3. Basically, the engineering teams. I am particularly in charge of the junior engineers, so I oversee the hirings, the training of graduates. The way we work at Company 3 is that we have a lot of teams called squads and each of these teams have a team leader and I'm basically the Engineering Manager for the whole floor. In particular I also oversee the hiring of the junior engineers, from graduates to juniors, maybe from 0 – 2 years' experience. I oversee the training of these engineers, skill them up so that they can then be moved to these squads that I spoke of. So typically, these guys will come in with very little experience, the bare bones, whatever they picked up at university and then the target is to get them, you know, team ready between 6 – 9 months. So, probation is typically 6 months, I try to make sure that at the most we take up to 9 months to ensure that these guys have the knowledge they need to be functional and ready to succeed in any of the teams we have on the floor.

INTERVIEWER: Ok, that's quite a big job, quite a daunting job.

RESPONDENT: So, sure it is but I am quite passionate about the success and careers of the engineers. I myself had a tough time when I graduated and I was looking for a job. A lot of the time it was difficult to get mentors or people in the company to skill you up, typically you were just left to your own means and you'll find that you not growing as fast as maybe some of the other guys XXXX, especially coming in, you know, the early 2000s, so I didn't want that to happen to anyone else, and so I saw it happening at our company and I saw that this was a space that needed someone to move into but you know at the time everyone is focusing on their own careers, nobody really wants to focus on building up everyone else's career so I saw this as a space for me to move into and make sure that no-one goes through, you know, the pain points I went through when I was starting out in my career. So obviously it started off very difficult because you have to convince the company that this is something worthwhile to do cos it's a lot of time that you spend. You also have to change the mindset of the leadership that we can actually instead of hiring people that are ready to jump in and start resolving any issues we have at a senior level or intermediate, whatever the need is. We better off hiring at a junior level, hiring more than we need and think long term and grow this talent internally. Within a couple of years, we will reap the rewards because we will not be hiring these expensive engineers. We will actually be growing our own and be targeting their knowledge and their growth exactly the way we want.

INTERVIEWER: Absolutely, I am so with you on that, you know, short term effort for long term gain.

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: So, sure, it's not an easy question to answer because it varies from student to student and sometimes from university to university but for the most part it's really the experience, you know, so

typically as graduates they will have a background knowledge but they will not have the experience of tying in the theory they have learnt to actually practical industry knowledge. Even just from the interview, when you ask questions, you know, a senior engineer will answer the same question in a different way because there is that experience of working with this concept whereas the engineers, the juniors or graduates will typically answer in a more textbook answer instead of a practical answer. So programming is a very practical skill, obviously the theory knowledge is great because it lets you think through your solutions but you need to be thinking in a practical manner and you need to be able to design. I guess one thing I can pick up is actually design, just being able to design a solution, visualise it and still have all the theory that you've actually learnt and apply that to a design that you've actually satisfies the requirements and the other thing that I've actually noticed and these are mostly in interviews is they tend to forget the basics, the stuff they learnt, you know in 1st year and so on and they focus on the more complex ideas and typically you really want to look for a solid base, a solid foundation so if you looking for a candidate you really want someone that can show you that they have a solid understanding of the basics. Anything else, you can build on top of that as you would a house or anything else, you really need to lay the foundation and make sure that is solid.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: A quality graduate is typically one, who you know, keeps abreast in the advancement of their subject like their major. So, let's say, this is software engineering so let's say Java was their interest, they need to make sure that they keep up with all the advancements in the Java programming language, right, and they need to be keeping up with a lot of the, maybe the open-source projects that are being written in Java. Just make sure that, because you don't have to be working to be writing code. As long as you have a computer you can write code so a quality graduate is one who writes code all the time. Now coding is a lot like mathematics, if you not going to be coding, you not going to be any good at it. Just reading a book is not going to make you any good at it. You need to code every day and you don't need a job for that, you just need a computer and you don't even need a team because there are a lot of open-source projects out there. You can just join one of them, volunteer even just like to be a translator, so you have this file and you translate it to any language that you are comfortable with and you boost that code up. So, it's really about hard work and you have to keep up with the advancements that you are interested in and this doesn't just apply to programming or engineering, it's with any subject. You just need to make sure you are keeping up with your interest.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: So typically results is a part of it, how they performed, but we want to look at, you know, what are they doing outside their university studies. So, it's not just the A's we see on the paper because we are also very interested in the person, not just the certificate. We are hiring a person and that person has to fit into a community that we are building in a certain way, so they need to fit into what a Company 3 community member should be like. So, you have to have certain attributes like, we go for, so the person has to be very smart but be humble but you know that is a very thin margin because typically very smart people border on being very arrogant as well. So, I have made a couple of mistakes when I

was hiring in the past where this guy blew my mind, he was very smart. I detected that he was very smart but it was bordering on excess almost on the point of being, you know, on the arrogant side and I could tell that this person might not be a good fit for the way I build my teams but I'm looking for that intelligence, I'm looking for that attitude of go-getter, hungry, you know, can do attitude and typically such a person doesn't fit in our structure, they arrogant, they are selfish they are the ones who want to push forward at the expense of everybody else. So, I typically get rid of such candidates shortly after. I really want smart guys who are humble and hungry. So, you can tell this person wants to succeed but at the same time has no ego at all or very little ego and he is always available when someone wants to ask something, even if it's very low level. Someone who takes the time to make themselves available. So, this is someone we can build a team around as we build his career into tech leader or team leader because we know he is a very supportive person and we can build all kinds of units around them.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Sure, so, minimum requirements is that you need to have done mathematics, you need to have completed your honours degree in computer science or a relevant degree. It could be electrical engineering or any other engineering, as long as you've done a little bit of coding, you know, while you were doing that. Sometimes we do hire candidates without computer science, or who studies something else. Just recently I had a candidate with a biology degree but typically I will send them a coding exercise just to see if they can, you know it's a very simple thing to solve. I look more for, I don't send something difficult because I'd like everybody to be able to solve it but there are things I look for like: have you written unit tests, have you looked at your code after you wrote it because the task is quite simple. So, I'm looking more for your styles, is it written well, is it fitting with the standards of object orientated programming. Did you think about this and that? Did you think beyond the task and maybe consider the things etc? And I also don't want it to take too much time because typically these are students who at the time are preparing for their exams etc. This then gives me insight into how the person thinks and then in the interview, this guy was doing biology but he was just killing it. I relaxed the requirements to get him in because he was doing far better than most of the students that studied computer science. He obviously had taken the time to read up and inform himself of the things he wasn't actually studying.

INTERVIEWER: So, one of the critical skills that I can now say from what you say is critical thinking or actually problem solving?

RESPONDENT: Correct, problem solving, attention to detail, as you said critical thinking, you know, the degrees is great because we can just look at something and have kind of like a baseline. This is what we can use to compare everybody and be fair but it's beyond a degree, again, we are hiring people and not hiring pieces of paper.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Sure, ok, if we exclude the current situation, typically I create the task and stick it on GitHub and I don't really explain any further to them. I just tell them here's the task you'll find it at this location. I'm expecting your task to also be returned back to me in the same GitHub. They need to then think for themselves, if they don't know what GitHub is, they need to do some research and be able to know what they need to do from there. So that's an online tool, its freely available so as long as you have a browser you can access that. And then the rest of it, I will go through the same tool and I will give them feedback on that same tool and if they go through that stage, we'll have a telephonic stage which I do over zoom and I just basically for about 20 minutes ask them some basic questions just again to do the filtering, so the first step would be the code filter. Initially we screen the cv and then the cv, that's where the paper side of things is. We look at that and we screen through that. If there are people who look interesting, like the biology guy, why is he applying for this. And then it peaked my interest and I thought ok, I'll send him the code and see what his about and I'm glad I did because he was kick-ass. And then after the cv filtering, we have a code assignment that I send them, then they go through that and then the telephonic about 20 min and we use zoom for that.

INTERVIEWER: But you do that right?

RESPONDENT: I do that. And basically, it's a set list of questions. I ask all the candidates the exact same questions and I will mark their answers accordingly. And if someone goes beyond just, you know, answering as I expect then I put a star next to them. Maybe this guy is worth keeping an eye on. If they do well there then we bring them into the office for an on-site interview. Then I get maybe a couple of my colleagues to join me in the interview and then we ask them a lot more questions and you know, a couple of other things and then if they do well there then we discuss and depending on how many open req's we have, make the offer.

IQ 1.2.2: What are the success indicators that approve a graduate for employment? So actually, you answered that with the tools because they first have to pass the screening of the CV, then from there, the GitHub exercise and then from there the telephonic via zoom and then the interview, onsite and then once you happy you will make the offer.

RESPONDENT: Then we will make the offer through whatever app the recruitment team is using. These change all the time so it's pointless mentioning it.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: It is, you know, time is precious, especially for me, I really need to be careful with my time because I work with a lot of junior engineers and typically, they will need some assistance here and there. So, I can't afford to waste time, to bring someone in for a long interview, I need to really, so when I'm looking through CV's, I'm looking for certain keywords, I don't even look through the whole CV, I look at, ok, they graduate, what did they study, what average did they get, you know, that's it and I move on

quickly so it's really just browsing through and with the code exercise, this is something I came up with myself, it's not available online so I know how to quickly go through it. I'm actually automating it now so I get it automatically marked. But it's nice because you get the character of the person from the way they code and then some people, you can see that they got a little bit of help with the exercise because now when you ask them questions and concepts, they actually don't understand what they coded on the other side. So, for the 20 min telephonic, I'm not just asking them these questions and I keep them simple for a reason because I really want to focus on looking at the person. I want to focus on seeing how they react, is this someone who is comfortable talking to a stranger, is this someone who is legible, do they speak clearly. Is this someone who can communicate effectively, While I'm talking are they listening or are they talking as well, so effective communication. All these side little skills I look out for in that packed 20 min or at the same time just doing the typical grading that everybody will be done on. So, in that 20 min, I got quite a lot of experience in this now, I can figure out if this person is humble, hungry, they fit into the things I am looking for. Sometimes I can pick out quite clearly that no there is going to be an issue with this one, so they don't communicate effectively, so while you trying to talk, they start talking and cut you off and they do it all the time, so in that 20 min they've done it 12 times and so now you understand that this person will probably struggle to learn anything because they don't give time to actually listen to someone finish what they say.

INTERVIEWER: So, what you saying is that the advantages of screening is that it identifies sooner rather than later the kind of character you don't want, like a filtering.

RESPONDENT: Ja, that's exactly what it is, it's a filtering system.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: I can't think of any, it's really not a disadvantage unless you do this whole day, but even so it's a waste of your and the candidates time to just not filter people out very quickly. In my experience it doesn't make sense not to screen. Infact the whole interview process is a screening process, might as well just get CV's and hire everyone if you not going to screen.

INTERVIEWER: So, I ask that question because you never know if there is something along the line of, during screening that made you change your mind or maybe one portion of it that didn't work out well that you had to remove it, you know, that's why I, ja.

RESPONDENT: I see, I see, look any process you setup for whatever the task, it has to be fluid and has to be dynamic and you always have to constantly have to review it. In software engineering we are used to this, our world changes all the time so we want to be able to interchange. I do that almost every 6 months. That last bit, because it is the most expensive, the onsite interview, that typically takes an hour, sometimes longer. It is normally the last thing I do because of the amount of time it takes away and also, I will need a couple of colleagues to join me for that so it's not just my time, its other people's time, so that's always the last thing. These are the sections, I always interchange them. So sometimes I will start with the telephonic because in that period, that 6 months I don't have time to be reviewing

code, so I start with the telephonic, its 20 min, its quick or maybe I want to change the exercise, I've given it out too many times and I think it's kind of well-known out there so I want to come up with something new and I'm still thinking about how to mark it and so on so it takes me typically too long so I will shift my processes around so there is still less people coming onto that stage than before. So, it becomes like a mental exercise, so then I can move it to the front because now it takes me quicker.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: Sure, so I wouldn't say it's the process itself. I think the process has always been ok and correct. It's really because the process is managed by people, me included. So, they don't realise the error margins. Sometimes I am being pushed by execs to get a hire in by this quarter and at that point typically, then let's say Q1, February or something like that there isn't very many people applying because a lot of people changed jobs in January and many graduates are already in jobs or they still doing their last year or something, so you don't get a lot of applications in but you are being pushed to hire someone then you end up hiring someone that wouldn't typically suite your standards and you think to yourself, ok I'm going to have a little bit more time to work with this person than before and quite honestly, that typically doesn't work. So, I've learnt over the years that I need to trust my process and make sure that I work inside that process and not second guess myself cos that is when I tend to make a lot of mistakes.

INTERVIEWER: And possibly your gut, sometimes you just have a gut feeling that this guy is not going to work.

RESPONDENT: Yes, correct, and the other way around as well. This guy is going to work. There are a couple of genius engineers that were not 100%, who I would've hired at that time but when I was having the telephonic, the 20 min, there was just something about this person, they just looked like they would be a fit 100% for this company, just fit our community 100% and on the soft side, they tick all the boxes, super star level but on the hard skills, the technical, they just a little bit above average and I have to choose between the guy who was really excelling on the technical skills but on the soft skills was really almost failing. And then you have to go with your gut, trust your gut, because it's easier to skill up someone technically than to change the way someone is, you know.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: So, it's a joint venture, typically for each department. The department heads are responsible for job descriptions, so it would be myself, it would be the director I report to and a couple

of the senior engineers who will be involved in that also and then we will involve HR because HR will have to improve the structure and so on.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: So, typically when we started out, we would search online and source everything that we need because this isn't a problem that needs to be solved because this has been solved a long time ago right, so you can just go online and grab a template and look at it and look at exactly the template that suites your company needs at the time and that's good to get you started but as you evolve as a company you can then add or remove things and make sure you come up with something that is custom and fits your idea of an ideal developer as much as possible. So, that's basically the process that we have gone through.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: So, it depends on the role, so its typically the hiring manager. So, each role that is open has a hiring manager and this hiring manager is responsible for the hiring of the candidate, junior engineers, graduate engineers, even senior engineers for certain positions right. So, if we are looking for a data scientist you know, we might be looking for a very senior data science because the previous one just left and there is no-one from our grooming team that we can push to that level so then we would get the hiring manager. Typically, the person who was working with the guy that left. The manager of the person who left the company would then be the hiring manager. They would be in charge of hiring the replacement.

INTERVIEWER: So, for the graduate, the person who sets it up

RESPONDENT: It's me. I work with our internal recruiters, P7 is one of them, so I work with them. We actually have a very complex program, it's not just a typical recruitment like hey source me some CV's, I'll look at them and then tell you which ones I like, no I'm actually very involved in the recruitment process, the sourcing of candidates such as CV's, what we do at universities. We have a stall at most of the universities in the Western Cape and we go there as engineers you know, the recruitment team, we go there and the final year students come talk to us and every now and then we invite them to the office as well. We have a full day where we dedicate the day to all these students from all these local universities to come in and over that day, we will have a couple of projects that they can work on and every hour or so we will have one of the tech leads to come talk about what their team does and so on. Thats the work we have to put in, our company is relatively new so you need to get that brand out there so if they are applying, they need to know what is Company 3 and they do know because we are doing all this work behind the scenes, you can't just look at LinkedIn and get CV's. Sure, that will work but they need to trust the brand and we need to be there. When they are thinking "I need a job", then they

shouldn't be bothering to be looking anywhere else, they should just come to us and say "Hey, hire me" because we already have that relationship because of all those events we've been having out there at the universities.

That is called pro-active thinking for sure.

We want our execs to see the fruits of the juniors scheme we trying to push through. If this fails, they are not going to support it anymore and in order for them to support it, there needs to be a pipeline of candidates that comes through all the time. So, whenever they say go hire a bunch of juniors, we need to be hiring juniors and we can't then say wait, we need to look for CV's. We need to have people just knocking on our doors saying "Hey I want to come I'm ready"

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: So, HR typically, before you get your req, your request to hire someone, before it is approved, it has to go through HR. They make sure the money is correct, the level is correct, the hiring manager, everything is correct, the region because we are a distributed company with offices all over the world, the region is correct, the currency is correct, the finances tick all the boxes. You know the money has been made available. They do that in the beginning and once the req has been approved, this is now in the hiring manager's hands until the hiring manager is ready to make an offer then HR will come in and set up the contracts and send that to the recruitment team and once that is signed, they will be preparing all the onboarding and so on. So, they come in at the very beginning and they come in at the end.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: The hiring manager, in this case, me.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: For me the tests are the same because I want to measure everybody on the same scale but what we agreed to as a department the last, the onsite interview should be the same for everyone even if you are a senior engineer, you take the same interview. Now that allows us very early to pick up the super smart graduate because if they answer questions that we really feel a senior engineer should be able to answer and the junior should struggle with then we know we have someone special here. At the same time if there is a senior who can't answer questions that a junior can then we know this person is probably not the best person.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: So, its 6 months' probation and if they pass probation then they don't need to worry about probation anymore. In that probation period they are trained in all our tech and in our internal software as well because we have our own propriety software. We train them on all of this and in those 6 months we evaluate how quickly they are simulating that.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Correct, so there is, in part its probation. It's also called acceleration program that I created and there we accelerate their knowledge base and we compact about 2 years of junior knowledge to about 6-9 months. After those 9 months that person has about 2 or more years of knowledge and we not shy to give them responsibility either. The ones that are really shining through. We create super stars and the greater task is to actually keep them humble.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: So, if they do not make our probationary requirements, typically we will put them on an improvement plan with HR, typically around the 4th month if you can see this person is struggling, we will reach out to HR and say "Hey, I don't think this guy is going to make it. This is all the steps that I've tried to make sure that he improves and it's really been a little bit tough". And then HR comes and starts joining all the feedback sessions and we start setting tasks like, you know, you now have X amount of time and this is your targets. Every week we will have a meeting, it's called a peak performance plan that we put in place for them and if by the end of probation if they haven't shown a level of improvement, we are probably going to let them go.

PARTICIPANT 6

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: So, with our graduates who are coming in at the moment we have seen that theoretically they are strong but on the practical side there is a lack of skill there, or I wouldn't call it lack, maybe just, oh ja, let's keep it to lack of skill. So theoretically they can process information that is coming their way but really being able to, for us as, because most of our interns are placed in our tech environment so they having to code and quality check so for them, they are able to do that but to put it through to a staging environment is very difficult and I think we spend at least extensive time with them in the first 3 months, getting them to understand the full concept of the coding and having them play around with broken code and seeing if they are able to unpack that. So, from my opinion and experience that is what's been lacking.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: I suppose a quality graduate in today's time and myself as being in the people's side of the company, is somebody who is hungry and ready to learn, who can take on challenges. So, besides the fact that people go and study and they do have a qualification you get to a point where some people want to make massive gaps in their career and ultimately are not willing to sacrifice the time and really start from the bottom up and learn from their peers and more wanting to excel and see their job title changing. So, for me a perfect or rewarding graduate is someone who wants to invest their time and really see things through and really understand the role and who is able to fit in an environment that can easily change. I mean with covid we see, we can see now with covid how people can adapt to change without a heads up like hey this is happening, so if somebody is able to adapt to that change then embrace it and you know, working collectively with the team and the loyalty is there then that would be a great resource in terms of someone joining the team as a graduate.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: I think what I mentioned now in the previous question is kind of similar, like I said, somebody that is hungry, humble, somebody that is able to evolve, and that is basically, and the reason for that is because of our environment. We are a young, dynamic company. The product that we have is very complex so you would need to invest your time in really understanding the business as a whole and not being one minded and saying "This is my job description and I'm not going to deviate from that" and really being able to understand, "Ok, this is what Company 3 does, this is how they do things, this is who my team is". That to me is somebody who will reap the rewards that come your way but will also be able to evolve like the company evolves.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: So, the technical skills that we normally look for, because it's based on our product, is Java, so somebody that's got a Java background and skill, as well as JavaScript. I've known that a lot of our managers have started looking for people that have really good Python and, I don't know if I'm pronouncing it properly, is it Hadoop, am I pronouncing it properly, so ja, those are the fundamental looks that we always go through and see if people have, either have background knowledge of it or have at least a couple of months or a year experience with that type of coding language.

INTERVIEWER: Are those the only skills you need?

RESPONDENT: Well, I mean for now, yes, besides other skills within our various departments, but from a technical, because most of our interns go into software development. We haven't really opened up, internship programs in other departments yet, and that will probably be something within the foreseeable future, but most of our interns go straight into our technical environment.

INTERVIEWER: Now maybe you misheard me, what are the critical skills not technical?

RESPONDENT: Oh, critical. Okay. Critical skills, for graduates coming into our company. I'm not really sure on that, Sonja, what would be the critical skills.

INTERVIEWER: You mentioned earlier, you said, that development side, but is that the only skills you need for them to?

RESPONDENT: Yes.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Okay, so with our graduates and with most of our, with all of our employees or new hires as they come in, what we do is, we have a system called greenhouse, which does all our ads, the CVS or resume's come through greenhouse it's then, vetted by the, our internal recruiters. So if the hiring manager or the department head is looking for an intern or a full-time employee, they would then raise a job requisition and then an advert would go through which obviously the recruiters will collaborate with hiring managers in terms of what do you need, what are you wanting to achieve? What's the job spec? What the job spec looks like in order to fulfil that role. Then the recruiters will screen the CVs.

Then, after going through the selection process of finding what best suits the job spec or the requirements, the hiring needs that gets in through to the hiring manager to review, and then the first round of interviews will take place. That is normally happens with the hiring manager and the recruiter. It will sit in and do interview with the individual. From there, if the person is successful in the first round,

there'll be a second round of interviews, which will then be the team lead, dependent on the current role. If it is a graduate, we won't be sending off a test kit. That's more for people that have prior experience. People coming into a junior, middle or senior level, then there'll be a test kit for the individual to complete.

That's also just for us to engage because sometimes as we do interview the answers, the individual would answer the question, that we would obviously want them to answer, but then we still don't know if you are in the right fit and what's happened in the past is it's been phenomenal for us to do it because we get to see that some people under estimate their skill. So, they would apply for the junior role and because of the test kit, we're able to see what this person does. This person is on a level of a mid, level position, maybe like a software analyst. We are able to then place this person on a higher level and then still have a junior level open for other applicants to come in. That's normally how we would screen the CVs and screen the candidates.

If successful, after that, we will issue the person with a, contract implement contract.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

RESPONDENT: Firstly, just making sure that, what the graduate says is true. Mostly by, if the person says that they have completed their studies at the university of a colleague or a Technikon, so we would want to employ somebody that's already B that has, studied and completed their studies. We've had applicants that have tried to apply, but that are still currently studying, but we've realised that people, those individuals tend to focus more on studies, then actually trying to learn on the job. We prefer people to have completed their studies and then seeking internship with us. If the person has also coming back to the answer is, somebody that has an academic background or somebody that, says that they all have completed their studies and has a, a degree or diploma in X and then obviously, like I mentioned, during the interview process as we engage with that person, understand if this person is hungry, wanting to learn, willing to start from the bottom and work themselves up. Because at the end of the day, what we want to do is after your intern, we would like to offer this person a permanent role, but it's also dependent on if the person's willing to stick it out. Or if this person's just wanting to use the six month as a stepping stone and really maybe wanting to go to another competitor. It's also just trying to understand where this person's mind set is. If they are, invested in the time and invested in the growth, then that would make, I'm losing my train of thought here.

INTERVIEWER: A successful.

RESPONDENT: Yes, a successful candidate, yes.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: I suppose the advantages of using screening tests is really to, assess certain gaps. So, I mean, once you put an ad out there, we will get so many applications and sometimes individuals on, either doesn't have the background or doesn't have the knowledge and with the test then by having this it does allow us to basically sift through, the applicants and going more to a granular detail of, okay, what, is this the person that, does this person on paper look like a potential, person that could be an intern or a full-time employee than to review every single CV and allowing people to come in for interviews after interviews after interviews so for, in terms of also the duration, I mean the recruitment, the life cycle can be quite lengthy and we obviously want to ensure that when somebody comes for an interview, that they are placed within the next two weeks after they've submitted their CV. So, by using that, it eliminates the longevity of the process and making sure that we get to the cream of crops. And, then we can show that you're able to get the best to come and work for us.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: So, the disadvantages, I suppose it's also like a catch 22. Some people may become nervous and, at the end of the day, you could also lose out on an opportunity because you based your decision on a test and not really engaging in this person, because let's face it, interview processes can be quite stressful and, can also make people feel like they're little bit incompetent and the way that they may conduct themselves or the manner that they speak, or they come across as an introvert. Immediately, one would think like, oh no, this person's not going to get along with my team, but it's because we never gave this person enough time or an opportunity to really fully understand them. So, the test could also, be a disadvantage where we might see something and then think that, okay, this person did poorly so we're not even going to bother, meanwhile, this person just needs a little bit of time or, was feeling overwhelmed. We didn't even think to maybe have an after, consultation or interview after the test to further engage with this person regardless of just shutting them down so for me, I think that could be a disadvantage or is a disadvantage.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: Yes. I think it was two years ago where we had an individual who was, who came into our company as a junior software engineer. Also just, graduate, but had I think a few or something like that, experience at another company and then obviously applied for a job and we sent the test kit and this person was excelling in the test kit and we thought this was an A-player. We cannot lose this person, lets hire this person. Three months after that, we started seeing, cause we've got a, like a check-in. So, every month, they, the manager does a check-in with the individual. Just a quick check-in, how you're doing, what you need.

For the manager also to engage with the person, how you feeling, is there anything that you need from me, or this is the job expectancy, this is how you've been progressing, et cetera, and building that relationship. Anyway. Three months later after the check-ins were done, we started seeing that this person's performance started deteriorating and this person wasn't able to unpack certain, because

everything goes through with ticketing system at our company and this person wasn't able to articulate proper instructions that was given to this person. Also, the coding that the person was, in broken or just didn't look right. And we did some investigation, about that. We realise that our test kits are sent to the individual in the comfort of their home and not actually done at our office.

If someone comes in, we send them the test kit and we asked them, we tell them, okay, you've got X amount of days to hand that into us. What happened was this person used somebody else, or somebody else did the test kit on behalf of this person and submitted the work. When we asked this person, what we did was, because we had a suspicion about it, and the manager, at the time reached out to me and then we tried to performance manage the person. We decided to present this person with a test kit and to do it within working hours. We saw that the two wasn't correlating and that's when the person also realised like, okay, I'm going to be caught in the act. The person then thankfully resigned, but that's what can happen and has happened to us, we, unfortunately, we thought were hiring a star player, but it's because of our recruitment system. We give people the benefit of the doubt and we end up sending them test kits, but it's also just to alleviate the stresses then to come to our premises, do a test and then knowing, okay, within the next couple of hours, I need to sit in front of this panel now, and they're going to review my work where from the comfort of my home. I can, I've got more time to do it. I'll be a bit more pedantic and really show off my skill without the stresses of people hovering around me. And that's what we ultimately doing. And we still continue to do it.

We haven't asked people to come in and do the test kit. We still send it through via email and allow them to unpack that at home.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: The job descriptions is ultimately done between the hiring manager. Obviously that person is the one that's requesting the need or the resource. We have a tooling, which is called JDM a tooling in our company where we try and standardise our job titles and our job descriptions. All the manager needs to do is: what is the person going to be doing? What's the skill? Is there various tiers towards, say someone being a junior or an associate product manager is it level one, two and three. We've got our, organisational development manager who then helps build, at the same time, a career path for that person even though that person hasn't even stepped foot in our company yet. The two of them collaborate and ensure that the job description gets done.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: The characteristics part of it again comes through, is mainly formed by our department head in conjunction with our director of people, which is my manager. We look at the competencies and, more, and structuring that within the different levels and with the use of the JDM tool. Between the department head and the director of HR, collaborate and make sure that the characteristics are fit for the team.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: The screening tests are normally, done by the, it depends on which department within the technical team. So if it's got to do with our say quality assurance analyst, then our director of QA will ensure that the test kits are created. We use that and we've had the test kit for about two years now, but it gets evaluated every year because obviously, the methodology of learning obviously changes, people's skill level, academic level also changes. It's also good that we review it to ensure that it's not outdated and that it does speak to somebody coming from a tech or college or university. In a nutshell, it's dependent on the department, each department head, does the test kit.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: So, with HR we do, or I do mostly the background checks. So, it will be the background checks. It will be the, reference checks as well. Dependent on departments, mostly in our operations department, I will sit in on the first level interviews, and that's more just a culture fit. Understanding if the person is a culture fit within our organisation, but most of the decision-making does, is upon the hiring manager and the operational lead of that department.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: Again, with our graduates who are still mostly in the technical or the tech team, the test kits gets drawn up by our principal manager at the moment. And then reviewed by our director of engineering.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: So, our test kits are, so it is different dependent on the level, but not on the academic so if somebody is coming from a university versus a, somebody coming from a college, they will get the same test. If it's someone coming who has, applied for mid-level role, we will let them do a test kit that's a bit more, technically advanced than someone coming in as a junior, so they will get a different test kit.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: So, after the graduate is employed. Then, dependent on the duration of internship, and most of our interns have been with us for three months or six months. Like I mentioned, there's the monthly check-in. They will be check-ins and ratings as well as peer reviews done on the individuals. This is for graduates and full-time employees. At the end of the day, we trying to incorporate the interns as if they would be completing the internship and then being with us on a full-time basis.

It's kind of doing a 360 evaluation on, your actual work and also characteristics like how well does the person deal with the team, is this person able to articulate, is this person able to communicate on various levels within the organisation, because if you're coming in as an intern or a senior person, you get exposed to so many more levels, that it isn't a case of, okay, I'm in the junior team, I went to speak to a senior manager I now first need to speak to my manager who will then speak to the senior manager. From the get go, the graduates with will get exposed will collaborate with people on various levels. We think that's best because that's how they get incorporated into a normal working environment, than to isolate them from the rest of the organisation.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: So, with our graduates, there isn't necessarily, a full kitted, unfortunately with Company 3 there isn't a full kit training development programs for the graduates at the moment. It's, we use the check-ins, like, how the full-time employees would do probation, the check-ins we use the check-ins as part of our evaluation. In line with that being able to see, and I can say that the graduates will be exposed to not only the current department, that they will be, interning in, they'll get exposure to the other departments as well. They can perhaps even move into a different role than what they started off with. So, it's very versatile. We don't have a full structured process or, training guide.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: I, I suppose again, to what I mentioned before using our check-ins, our evaluation check-ins, and that all gets documented in the system, which is our bamboo HR system, which is the HRI system where they'll do the check-ins and all of that evaluation gets documented in there. Once the person, if the intern is successful, the life cycle will continue at Company 3, but if they individually is unsuccessful and we are still able to retrieve the evaluation and the documents by downloading it, and they can use that, to use as part of the employment at another company. It's got obviously the set of questions, the evaluation from one to five, the manager gets to say: there is room for improvement needed, how this person has been excelling. And then there's the peer reviews.

How is the person, been working with other peers, and all of that will be at least to the person's advantage to add to the CV and to be used at, if one is to seek employment elsewhere.

PARTICIPANT 7

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: That's a very broad question so we only look for software engineering graduates for our technology stack so we are a java house so java is the main language that we program in and what we normally do for the software graduate position we look for people with 0-2 years' experience because the role in itself its, if you hire someone with more experience it might not be as challenging for them we just actually want people to be in a role for 12-24 months and then we promote them so graduates come in hungry. Most of the backgrounds we looking for is computer science degrees, honours, obviously masters that will be a plus for us, information technology as well but we also hire people who are not necessarily degreed but has the experience and the skills so if you code in your spare time and you build projects and things like that, that counts in your favour as well, you stand a good chance of getting a job at Company 3. But our minimum requirement is a computer science degree which is a bachelors.

INTERVIEWER: But when they come in what do you think they are missing, what are they lacking like if you look at the holistic software development graduate, not even someone who has experience, just off the bat from varsity or Technikon. What do you think in your opinion when you have them in the workplace are they lacking or even in an interview, what is the one thing or not even one, however?

RESPONDENT: I won't be able to answer that question because we don't interview the candidates throughout the process you know, that is the question you can get from the hiring manager what we look for as a recruitment team, does the person meet the qualification requirements, are they capable of coding in the language that we operate in, do they have the 0-2 years' experience, do they understand the technology stack that we want them to work on, do they participate in coding projects outside of their work hours? That's usually what we screen for and then we also screen for salary requirements, potential start date notice period, things like that. The rest is done through an assessment, the hiring manager decides, he first interviews the person to see if there is a culture fit, can the person answer a certain level of questions you know, which they want them to answer, I don't have access to the questions, as a recruitment team we can't give away the test that's a good question to ask the manager, we just do a basic screen, make sure the person ticks all the boxes in terms of the requirements we are looking for and then we put the person through the process

INTERVIEWER: And the hiring manager would be P6.

RESPONDENT: P5.

INTERVIEWER: Oh ok, P5, yes I'm interviewing [P5] later.

RESPONDENT: So I would say ask him that question what people are lacking and things like that but I mean our requirement is, you know we look at our previous hire, that's our benchmark, so every time we would get someone like that we would fit that profile at the same level or better because we always want to bring in better people going forward.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: So every graduate is different in his thinking, but if I had to create a profile, someone with an honours degree in computer science, that's a good indication for us, someone who is capable in coding in java, someone who is always looking for problems to solve, people that are, so there is something called GitHub, so GitHub is a repository so people can write code and people can review their code so someone with a GitHub account who has done a lot of projects and also just people who are looking at projects on the side that they can work on that they can practice on, curious people that's something we look at as well, that's for us, for Company 3, I can't say the same for another company.

INTERVIEWER: Ok that's perfect, so you say that someone who is a quality graduate goes over and above their qualification.

RESPONDENT: Yes.

INTERVIEWER: Someone that is on the side, coding, exploring new technologies etc.

RESPONDENT: Yes so your degree is often not enough for us, we need a little bit extra.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: Yes, determination problem solving, somebody who is able to work in a team, we need team players, someone who displays emerging leadership. Emerging leadership is situational leadership so when people are in certain scenario's, can they do that somebody who is not necessarily only theoretically smart but can apply the theory, that is what we look for and then I mean, the team culture is you know people who communicate well, who not arrogant, people who are humble, hungry and smart. Those are characteristics that we look for in graduates.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Ok, they need to be able to code in java that is obviously for us a must or C C# is also similar, those two languages, they must have a good understanding of the syntax's and things like that, somebody with a degree in computer science, I don't know if that is a skill its more, that's a qualification right. Look, I'm sorry if I'm stumbling over my words, I'm not involved much in the graduate recruitment so I have to catch up on things but critical skills are java, programming skills, qualifications would be computer science degree or honours or information technology then somebody who understand an IDE

or command line tools such as eclipse or (telijay) and then environment wise, someone who can work in agile environment where things are always changing

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

Did not ask the above questions

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Major advantage cos we can see throughout the process if somebody can do what they say, so often what we do in our process the recruiter will have a call, tell them about the team, tell them about the role, tell them about the company, get information from the candidate and then the manager would have a 60-minute conversation with them via video to see if there is a connection, are they meeting some of the cultural requirements and job requirements. If he likes that call, then we send them the development test and they would have to complete the coding assignment. The coding assignment is to see if he can code and the level he can code on.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: For graduates I think you need one because you can't hire just on hearsay and conversations. I know some people that are recruiters at other companies they say they didn't have tests and they hired people and they couldn't cope, it took a long time for them to do it. The disadvantage to a candidate would be getting a job that they can't do and they (fail the corporation) and then the company would have to get rid of them. The disadvantage for a company would be hiring somebody that said they can do something that they can't but you can't really fire them, you have to give them a chance to prove themselves ten the company has to prove that they've done everything they could to upskill the person and make sure they are successful at the job so you looking at 3-6 months of time being wasted on both sides

INTERVIEWER: Absolutely, that's why I always say, when graduates enter the workplace they are just learning, you don't, you mustn't expect to get a return on your investment yet right.

RESPONDENT: Yip, takes a lot of time sometimes.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: I won't be able to comment on that, that is feedback you can possibly get from the manager, some of the exit stuff is sensitive.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: Every hiring manager needs to create their own job descriptions so that they tell us what we need to do.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: So again its coming from the hiring manager itself, he decides what he wants in terms of personality, in terms of skills, in terms of qualifications. We use something called greenhouse where we use a scorecard and the scorecard has different categories, so qualifications, personality, job level, professional skills, things like that so the manager sets all those requirements up and then he decides

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: It is usually the hiring manager and maybe like a senior in the team or the engineering director but its again its coming from the leadership.

INTERVIEWER: So leadership and maybe senior developer.

RESPONDENT: Yes.

INTERVIEWER: And or the engineering director.

RESPONDENT: Sometimes the engineering director as well yes.

INTERVIEWER: Probably dependant on the role right?

RESPONDENT: Yes, every, so if you looking at a data engineer, the test would be different, if you looking at a general software engineer the test will be different, if you looking at a QA, quality analyst, the test would be different, so every department has a different test.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: We are the recruitment leg of hr then our job is to look for the candidates basic experience, looking at job requirements, seeing if there is a match, then we ask questions regarding salary expectations when they can possibly start, so notice period or potential start date and then we want to find out why they want to join the company, the candidate needs to motivate why they want to join the company and if they are suitable for the role and then we use that information and we send it forward to the manager.

INTERVIEWER: So you are actually part of HR.

RESPONDENT: Yes.

INTERVIEWER: So that's how you are involved. So P6 would be the HR manager but you guys are a team inside of HR as well, that's how you are involved.

RESPONDENT: We acquire the talent, we sign them, bring them on board, then once the person signs the contract then we would on board the person so then HR gets involved in getting the person's particulars, signing them onto the system, onto the platform and then from then onwards, the hiring manager is responsible for managing the team but if there are disciplinary or anything like that, then HR would get involved in that as well.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: Again this is team specific, so it would be the specific hiring manager for that specific team who decides what they want the person to do as a test throughout the process.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: No, one standard test, for graduate software engineer, at Company 3, we use one standard test to make sure we can screen everybody the same you know.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: Yes we have a 6 months' notice period at Company 3, so you would have a 30 days 60, 90, 120 ad 180 day check-ins so the candidate will have a 6 month period of time where they can obviously prove themselves but then at the end of every month the manager would have a meeting with the candidate to review the goals that were set and obviously see if they were able to do it and then where they lack, they would obviously focus on that the next month but then they would add more responsibility.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Yes so every team pretty much has an internal learning and enablement program where we focus on improving the people but we also have a learning and enablement team that designs courses for the company so there is different functions about the business you can learn about different things , certain courses are compulsory, certain courses are not compulsory, ja its team related and then its organisation, so there is corporate training what we call company wide and then there is team training as well.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: That, I don't know if you are going to interview P6 but she would obviously be more involved in that but the manager would obviously have to prove that they did everything that they could to set the person up for success, if they couldn't do the work that we needed them to do then obviously you would look at an exit process, ja it's your standard labour relations steps you would need to take to make sure that every opportunity was given to the candidate to succeed, so I'm sure, do you know those steps according to the labour relations act that you need to take, the company also does the same thing.

INTERVIEWER: And that's it, that's actually all my questions. P7 I want to really thank you so much. What I'll do now is, I'll transcribe the interview, I'll send you the transcription so you can double check that I didn't put any words in there that's not supposed to be there and then if you can send me that document, just signed from your part but I really appreciate it and I thank you and maybe who knows one day I might just be applying for a role there at Company 3, who knows.

RESPONDENT: Sure, you never know.

INTERVIEWER: But thank you so much, you never know.

RESPONDENT: Your welcome.

INTERVIEWER: I appreciate it, have a good day.

RESPONDENT: Same to you, Bye.

INTERVIEWER: Bye bye.

PARTICIPANT 8

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: Ok, from my experience mostly, it's usually the soft skills and business skills that are lacking when a new graduate enters the workplace. They usually have the technical fundamentals down and they can code and will be able to learn but they don't necessarily understand and are good at navigating the business world in terms of meetings, how the work is done outside of coding, how do you track your tickets, how do you track your tasks, how do you voice concern in a meeting, how do you communicate when there is a problem. That is usually skills that I would think that are lacking but the fundamentals are definitely there. I also wanted to mention that they usually struggle with working at scale as well. At university the projects you do, the scope is usually small about 1 or 2 weeks and you've got the 3 or 4 specifications and you finish that and the project is done whereas when you move into the quote unquote real world, the projects are a lot more fluid and they are a lot more bigger and there are a lot more stakeholders that care about the project and to work at that scale and to work in a code base where there is a lot of things that are integrated and to work with each other that's also a hard thing to get your head around as a new software developer in comparison to the relatively easy stuff you do at university but ja, that's actually the big one that I think is lacking.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: A quality graduate is someone who has a good overview of the landscape they are working in so they have technical ability, they've got good fundamentals and they have the ability to learn fast. Thats the biggest one I wanted to mention. They could have 1 or 2 skills and they can have the basics but if they don't have the ability to extrapolate from that base knowledge, they are going to fall flat pretty fast and another thing that will make a quality graduate is something who can know and spot patterns within the fields. So, they will know this is how a frontend technology works, you've got the view, you've got the manager, you've got the thing controlling this and working with that and once you know the pattern working within a certain framework its relatively easy to extrapolate that to other frameworks.

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Critical skills, the obvious first one would be a base layer of technical ability. They have coded before, they have shown that they can get specifications, figure out what needs to be done to solve the problems and then implement the code and solve the problem and present the solution. As I mentioned in the previous point, another big thing is common patterns whereas specific technologies are less important, it's more important to know the patterns within those technologies, the patterns that

kind of span all the technologies, so this is how this thing is typically done, that is how that thing is typically done and once you know that it's easier to implement that in a specific language or within a specific framework.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: So, the big tools used is obviously zoom because these interviews were all done remotely as we were in the middle of Covid and the steps we went through was: firstly, I applied and sent through my CV and they got back to me and then they sent me a coding test. I think they gave me a week to complete. Once that was complete and the coding test was marked and reviewed, I moved onto, which can be called a culture meeting, where I just had a chat with the hiring manager. And they just asked where I was from, what I've been doing. Less technical ability and more just finding out what type of person I am. There were some technical questions. That was about 30 minutes and once that was complete, a couple of days later we moved onto, what can be called, the technical interview where the questions were a bit more deep. It was more about the specific technology I was going to be working with at Company 3 and then at the end in lieu of the coding test where one would write on the white board, it was more a design question that was asked where it was a collaborative effort between me and the hiring manager to solve a problem that was presented to me. This specific problem was to design how a file system would be implemented. I didn't have to write or send in any code. It was more a discussion about how I thought about that specific problem. And from there on, ja, that was the whole process.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Within those tests, going one by one, the CV, the advantage of that is just you get to weed out the people that are obviously not right for the position. So, the way I visualise it is like a funnel, the CV is the top of the funnel and you get a lot of CVs in and that is a way to filter out the people you definitely don't want to hire. The coding test, the advantages of that. Let me just say the disadvantages of the CV, it's easy to get a false positive, somebody could lie on their CV, that is the problem with using that as the first part of the funnel, the first part of the screening tests. Second is the take home screening tests. The advantages of that are that you can start to determine technical ability. You can start to see that this person, you can look at their CV and you can look at what they've done and you can say ok they've not lied about anything, they can actually do this. There wasn't enough time given to learn these technologies from scratch so you get a good idea of where this person is at which is the next part of the funnel. The disadvantages of that would be, its once again sort of easy to fake it, sort of easy to cheat, you could ask somebody else to write the coding test for you. This is in comparison to writing the code on the white board with the hiring manager there, where it would be more obvious and easier to see ok,

this person doesn't know what they talking about, ok, this person does know what they are talking about but that's also a symptom of, it was covid and everything was remote. Oh, just another thing I wanted to mention, I can't remember, I don't think there was an exit talk where I had to explain to the hiring manager why I implemented things or how I implemented things with the code as I did, so that's just one point, where it could've been done better, I suppose. And then moving on to the culture, the advantage of that is it's a 30 min chat with another person and you can kind of get a good idea what type of person the other person is. I mean you can't really fake everything for half an hour so you will get sort of an idea, do I want to work with this person, is this person going to be a fit. Ja, there is no real disadvantage for that. It's just having a good chat with the person you are going to potentially work with and then finally the technical interview, you can call it that. The advantage of that is, you can sort of see, you can gauge how much did the person improve between the 30 min interview and the more deeper interview. There were certain questions asked in the culture interview that were technical, when I was given the opportunity to move onto the technical interview, the same questions were asked again and they were expecting me to have a deeper understanding or better understanding of this topic. If you, do it like that, you can get a sense that the person is willing to do some work and to go look up the stuff that they are going to be using in the job. And I think the design question was definitely better than writing code on a whiteboard because it was more of a conversation and I think they could get a better idea about what I was thinking and how I was approaching the problem rather than just blabbering out some code.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: See answer above (advantages of screening tests).

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: There was the 6 months probationary period and within that there was a 60-day, 120-day and 180-day tiers. It consisted of me answering a questionnaire, just 2 questions: What do I think I'm doing well and what do I think I need to improve on and my manager would fill in the exact same form and then we would have a discussion about what do I think I'm good at and what do I think I need to improve on and that's a nice way to see: is there progress, is there stagnating or is he just pulling along and not getting better within the code base, within the company.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Yes, I think these indicators come in tiers where, so say for example you go within the 60-day, 120-day, 180-day periods, within the first 60 days you would want to see the candidates has a basic understanding of what your code base looks like and is able to fix small errors where the thinking

doesn’t have to be that deep and as you move along that will evolve into, ok, does the candidate have a broader understanding. The tasks assigned to him start to become more complicated and start to involve more parts of the system and then is he able to complete those tasks and throughout the probationary period the tasks become increasingly complex and involving more parts of the system and ja, the indicator that would be used is assigning him more and more complicated tasks and can he complete those tasks at a steady and reasonable pace. That would be up to the manager and the company to determine how those tasks would scale up but it would typically be, ok, easiest in an isolated environment, fix this small thing and then, ok, the tasks would involve the entire system and you have to keep a lot of balls in the air and think about a lot of things, that would be the most complicated tasks and then there is obviously a range in between and within that range there could be indicators that the candidate should hit.

PARTICIPANT 9

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: My response to that question will be interesting and it predominantly comes from experience what we've seen at Company 4 and broader what I've seen in my career thus far is very often you might get a graduate who has basically gone through some kind of program or some kind of study schedule, and they've completed the schedule, but they might lack in a practical kind of sense of what the work entails. That often comes from being eager, the graduate or the individual being eager to tackle their own personal projects. From personal projects, as a software engineer, you can learn a ton of things. Often you learn more doing personal projects than you might learn from a theoretical point of view, in a degree or in a program. Again, it's not to discredit what the degree of program offers. There's immense value in that, but when it comes to real world practical on the ground, examples of work that you've done very often, graduates don't have that to show.

I feel that if they have something to show, it can even be as something as small as a blog that they've created for themselves and their approach in their language of choice, anything to just show off their ability and their skill and what they capable of.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: When I look at graduates and individuals by and large across the board: what I really look for is the ability to think on your feet and the ability to take the initiative. That's a very hard thing to gauge sometimes because it comes down to the person and it comes down to a personality trait. Are you able to take things with both hands and pretty much figure it out? You use your intuition to find out how are we going to solve the problem at hand and not just that it's one of those interesting things where a problem is often so much bigger than what it looks like at the surface level. It's finding that individual has the ability to step down into a problem and really think about it from multiple angles. There's this idea called spatial reasoning and spatial reasoning is the ability to take a circumstance or scenario and almost set yourself outside of it or beside it, and then be able to look at it from various different angles and perspectives.

I think very often when it comes down to a candidate whose quality and who can fulfil a position at any company that is a great trait to have. That's the kind of thing that I look for. Again, it's really hard sometimes in a first few initial meetings to be able to accurately gauge that and be a hundred percent certain that this candidate is that kind of person.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: Again, I think it probably speaks heavily to the last answer too, but mostly somebody who can take the initiative, somebody who's a self-starter, somebody who really is passionate about their craft and passionate about the software that they're creating and not just passionate in the way that they write code, but also passionate about: when you look at engineering or software engineering in general, there's almost like an entire philosophy of thoughts around it. What I try and do is I'll try and figure out is this person in tune with that? Do they have the kind of characteristics that enjoys that? For example, often you might find software engineers gathered around a table over lunch, and they'll be able to speak about code and standards and different methodologies and philosophies and practices. It's just one of those things that you can see that they almost thrive off that kind of conversation, rather than thinking, I'm just going to be what might be termed a "code monkey", bang out some code, and then move on. It's so much more than that. So that's usually what I look for.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT:

- Ability to take the initiative
- Hunger to learn
- Curious mindset
- Problem solving skills
- Interpersonal skills

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: The screening process thus far, the way that we do it at three weeks off particularly is that we basically have an initial meeting with the candidates to find out more about the character so obviously I'm sure you can gauge from this conversation I'm very much a people's first person. I try and understand the individual trying to get into their minds a little. What makes them tick? What do they really enjoy about the job, all about the graduate program that they've just made it through and what are they looking for? So, it's a process of really vetting the individual in terms of tools that we use. There's nothing really specific. We more have a process that we follow and that process is as follows. It's an initial, face-to-face like what be having right now, usually off the back of that would lead to some kind of technical assessment that we'd have them do.

And then thereafter it would be a matter of speaking to them about that technical assessments. Funny enough, that's a more recent and that's a more recent introduction. Before we just used to look at the technical assessments and be like, that's great or not great, but now what I try to do as an ask a candidate to actually speak to us about the technical assessment. So, take us through what you've done. Why did you make certain decisions you made and with any trade-offs involved in the process of doing this technical assessments? I find that to be very informative in terms of you can really then learn

to understand the individual, how they think through that, thereafter our process, entails a cultural interview where I might choose a few random software engineers in our team, as well as people outside of our team who work for Company 4 and we get a feel for the person, how they'd fit into the company, how they interactions would be et cetera. As the final step, we would probably just wrap it up by having a final interview with our CTO. He'll ask the candidate, maybe some technical questions or not. It doesn't necessarily need to be, but then we'll move on to making them after that.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

RESPONDENT: What makes him go through to the next steps? Usually, it's a combination of obviously technical skill, but technical skill in the early days could be hard to gauge, so it will be a combination of technical understanding and personality fits. So, often it's about the kind of person and what they, what their dreams and aspirations are. Remember that the kind of company that we are, we a kind of company, that's trying to do a, trying to create impact in this, in the unemployment sector of South Africa. It's also one of those things that when I see an individual who looks at the code as a means to an end in the sense that they can use what they create in order to create job opportunities in order to change the mould for the better, that's usually something that would take them through to the next step, especially in the early phases, if they can dynamically speak about their passion and dynamically speak about how they pair their passion together with the software that they create. That's usually a good tell-tale sign that they'll be able to make it through the process.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Again, I mean, there are various ways you could probably do this, but what I do like about our method of doing it is that it's interpersonal. We get to know each other as we speak: As we speak technical, as we speak non-technical, it's about getting to know the individual, because again, I don't think that as a start-up, we're not at the critical mass size where we employing skill, we employing an individual and an individual as a personality, and they come with the little quirks and traits and all the rest of it. And we want to make sure that it's a good fit for the company, even though they might be amazing or not amazing technology speaking. That's usually the tell-tale signs that would then dictate the success or failure during the process.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: Disadvantages might be that what I find is, often when you send a technical test to an individual, they might, depending on the kind of individual that they all, they might feel intimidated by the process. They might feel that a technical test has a high expectation in terms of turnaround time, how quickly they must do it. It might feel like a lot of pressure. I often tell my various candidates while I'm interviewing them. It's not about the time that you take, it's not about doing and getting it back to me tomorrow. So, there can be a little more pressure felt by the various candidates. Again, it's a matter of

personally connecting with them and trying to help them to understand that it's more about getting into the mind, seeing how they think than it is about them hitting some kind of hard and fast deadline to place unnecessary pressure on them.

That that could be a disadvantage to the process. I think if I look at it's probably the better of the various forms of interviews that we could perform.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: Yeah. That's also a good question. I'm again, because we've made a handful of hires of the years. I think the only thing there might be that when you're hiring junior candidates, because they don't have much to show in their career thus far, it's sometimes hard to gauge. Obviously, the technical test gives us some idea, but as you will know, the online world, there's a lot available out there for software engineers to display. It comes down to what they're really capable of and the way that they really think it's hard to get inside a person's head so early. What that normally inevitably might lead to is you might employ someone who might not have the necessary technical capabilities that you might have thought they initially had. Again, it's one of those things. If you have the right personality fits, I think that every software engineer worth their salt should know that software engineering in general, IT in general, computers in general is an ever-learning journey.

You're always learning. You're always growing. You never stop learning and you never stop growing. You never reached some kind of bent. If you get the right person, who's okay with us. I mean, he's comfortable with growth. He knows that sometimes in order to see growth from a personal point of view, and from a technical point of view, you must be willing to put in the time, as you would imagine, as you would know, there's a lot of material out there online that can teach you to be a better software engineer. What we'll do then is point those junior engineers in that direction. I think that if you look at an interview process that could be seen as a few steps, not too many steps, you might miss some things along the way, which inevitably will lead to you, placing a candidate who might not be as experienced as you'd hoped.

Again, that's not something that happens too frequently, but from time to time, it could.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: Myself being the Head of Engineering and the CTO, we would formulate the job description and often it would be a process of him and I agreeing on something and making tweaks as we go.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: Yeah. Again, back to the, one of the previous answers that I made, so we obviously have a kind of a cultural or personality expectation that we normally try and to adhere to. Now let's speak to traits of an individual characteristics. That's first and foremost, obviously there's the engineering team. The team itself, has a certain kind of characteristic and a certain kind of culture that would hopefully find a match with the candidate who we are recruiting, where there'll be a similar kind of fit there, but also from a company perspective to. The company obviously there's a culture and that's why the cultural interview doesn't just consist of engineers, but rather other people within the company too, because we kind of need to make sure that individual can fit in the company and fit in the engineering team. I'm just double checking the question, where are these characteristics sourced from? So, the characteristics that we think of are really just the kind of characteristics that we believe that are good characteristics for a software engineer to have, and good characteristics for employee to have.

Like, as I mentioned, the ability to take the initiative with certain things is not necessarily limited to software engineering. It also extends itself often into the rest of the company too. It doesn't necessarily have to be a software engineering problem that you're taking the initiative with. That's something that we do look for.

INTERVIEWER: Are there any others, so taking the initiative and what more, like, maybe the ability to work in a team, or like.

RESPONDENT: Obviously, the ability to work in a team is important. Not really, it's not, it's okay if you bit of a lone ranger, but it's not really predominantly about that. It's more about wanting to work in an engineering team, but also being okay to work cross teams too. To interact or interface with the marketing team or the operations team, what the support team, and kind of just being the kind of person who is all around in the sense that you're comfortable to help wherever it's necessary, wherever help is needed, being willing to jump in. Again, it does come from that element that's based on trust and understanding that what we're trying to do here is grow something that's greater than ourselves. Because very often, if you find yourself in a position where it terminates on you, and it's all about earning a pay check at the end of the month, they're not necessarily about growing the organisation.

You're not gonna, you're not gonna really be inclined to pour your passion in in the same sense. Yes, I mean, those are good points, like being a self-starter, which talks about initiative, having a bias towards action, being people first wanting to understand people working in a team, teamwork cross-functional teams, all that kind of stuff that you've mentioned that we've mentioned that. Yeah.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: Yeah, that's fine. I can answer it again because there is an HR department as it were at Company 4. So, I set up all the tests predominantly now, but HR also does have a helping hand with setting up maybe a cultural interview or setting up the ability to phone references. There will also be a bit of a process there, but predominantly it's myself, Head of Engineering, I'll set up most of the screening tests that I've mentioned.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: No, absolutely. Again, it's one of those things where being a smaller company, not being as big and established as a corporate, our HR process is very light at the moment. It hasn't necessarily needed to be too cumbersome and we've liked it that way. We've kept it that way deliberately, but as we grow, we definitely feeling the need for much more of an HR weight in the process. As I mentioned, like their role then would be phoning references, setting up the screening tests, maybe even setting up the interviews. At the moment I predominantly do all of that myself.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: Well, that will be me, well me and the CTO. Obviously, I mean, our tests are very much tailor made specifically to the position that we're trying to recruit for. What we do is we have defined the position and this is the description of the position. What tests would pair itself well with that position The CTO and I would decide on that and when we're looking for candidates to fill that role, well, we'll send them that specific test.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: Yeah. Interestingly enough, again, speaks to the previous answer. I'd say that the software, tests that we send candidates is customized based on the position that we tried to fill. It wouldn't necessarily be based on the qualifications or the education institution. As you would know, I mean, you can get a self-taught engineer who would be able to do a test that an engineer that just walked out of UCT would be able to do. That's why you find the test to be very much like decoupled as a were from any institution, because if you can nail the test and show us that you are able to do the job well, then it doesn't really weigh heavily on the fact of, oh, you haven't been to UCT or not. Because as you know from a self-taught perspective, you often can teach yourself stuff that you might learn at a university degree.

Again, as I said earlier, we don't discredit university degrees either, actually on the contrary we do favour academics; we do like it. If you've got a mechatronics degree or mechanical engineering or whatever it may be. It's very interesting when you find an individual from that space coming into engineering, software engineering, and then things just seem to flourish from that.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: After the graduate is employed, there's obviously a regular one-on-ones check-in that we do with the graduates. We also assess the work that they've performed and the level of output that they've often performed. You also assess like the value creation that they've done within the company. What does it look like? Have they just stuck to the tasks that they've been given and that's all they've done, or have they looked beyond the tasks they've been given and they've thought about how they could assist them, making the company a better place for both our customers and our internal staff at the same time. It's usually a process of meeting with that employee and discussing their work and finding a how then we can evaluate that based upon past performance.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Yes. At the moment we don't necessarily have a training and development program, but what we do have is that we do like to encourage, as I mentioned earlier, continuously learning and continuously growing. It comes down to, you would imagine that there's a lot of online courses, such as well, a lot of online courses, sites such as Coursera or Udemy or Khan academy or many of those, and what we do encourage our engineers to do this budget for specific courses that an engineer would like to skill up. Very often what we find is that an engineer might have a specific skill set, whether it be front end or back end, and then they might want to skill up on dev ops, for example, and then we'll go out and get the course and make sure that they plot their way through the course. At least they learn something and take away something from that.

It's not very much, because we are a start-up environment, it's not very much like this is your job ABC, but it's more about if you want to know more about another domain that you might not be operating in on a day-to-day basis, that's encouraged and then we'll supply financial support for you to do a course like that, to upskill yourself and to grow yourself as an engineer.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: I mean, that's a tough one, right? Like it's difficult because the question you've gotta ask yourself there is, especially when it comes to new software engineers or juniors or graduates who have just come out of university or some kind of software development program, it's a matter of like walking a journey with that engineer and trying to figure out, where things are going wrong, if they are and why are they going wrong and what kind of support we can offer to that engineer along the way. You know very often it might be just a mere inexperience issue, or it could be maybe a lack of discipline or it could maybe be a laziness issue. Obviously, you have to try and gauge from that perspective where exactly things are going wrong. From that, then you can make certain decisions.

Those decisions would entail things like maybe having some kind of performance review process where you'd call HR in and you would sit down with HR and the candidate and you would say, listen, things

haven’t been working out the way that we had hoped and we’ve obviously sent you on all these courses and we’ve continued this journey, but we setting up this performance review process right now to have a kind of a close watch in how things are going and hoping that the outcome of that process would mean that the candidate themselves would get more serious about growing and learning how to become a benefits in the company. how to create more value within the company. Again, it’s also one of those things where it’s very seldom that this does happen because what we try and do is we try to be don’t use the word ruthless, cause that’s a bad word. In the interview process, you try and be as careful as possible as to avoid that. Because as you would imagine in a start-up environment, if you go down that road, it’s not that it’s like, as you said sad question, it’s not just that it’s sad, but it’s more that’s a lot of time wasted for the candidate and for the company.

For, to end up in, sorry, this isn’t the right position for you. Please move on because as well as I know that, inevitably, if you find yourself in a position where you are not performing, more often than not, the individual will move on rather than let it become this long-drawn-out thing. They’ll just go and find something else. Again, it’s, it works out when that happens, but you don’t seem to count the cost of the time that was spent on that individual. You almost have to be certain upfront and that isn’t always possible, but obviously we try as best as we can.

PARTICIPANT 10

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: I would say that practical skills and the frameworks used in the industry are lacking. A lot of the time computer science students will have a lot of theory, that isn't really used or the frameworks already implement in themselves. Obviously, it's useful to know, how things work from first principles. I think, it's also really useful to know how to use these frameworks or how to do certain things practically, with the frameworks in mind. I feel like, computer science as a degree, does not necessarily prepare graduates for the workplace, but rather prepares them to keep on going into academia.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: Quality graduate is someone with good problem-solving skills, very good soft skills, which is often overlooked, I feel. Good enough to ask the right questions, but also tenacious enough to dig a bit if they have to, which is part of the job that's always necessary. Yeah, but I think above all, if you can't be a problem solver, then you can't be a software dev.

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: I think, well, seeing as you're not really prepared in terms of practical skills, I would say one of the most critical skills is the ability to ask questions and not be proud in that sense, but also to ask the right questions. I think it's very important. Also, to not be ideally, if the company allows you to seek a mentor that you would indeed seek a mentor, I think that's really important. Apart from that also critically, I think, and a drive to learn by yourself because you will be doing a lot of self-teaching, especially with the frameworks nobody's going to hold your hands, teach you everything that can guide you, but yeah.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: So, I applied through this, platform called Offerzen. I'm sure you're aware of it. Yeah. They curate a list and I got sent a message from the head of engineering at Company 4 through the platform and he had a quick call with them and I think it was just an establishing call to kind of suss out who I am very briefly and what my, I guess vibe is for lack of a better word. After that, he gave me a technical assessment, which was, if I remember correctly, it was just a very simple application to fetch data from like a weather reporting station and send it back and then manipulate the adjacent strings of

it. Also then, I'd put it in like a and in a visible way. It was already chilled, yeah, technical assessments. After that, I went in house for a technical interview of not really technical, but more like an, a review on the assessment, the head of engineering, P9, just chatted to me for a bit.

He, yeah, he just went through my assessment and asked me a few questions and a few hypotheticals and I guess trying to see the extent of my problem-solving skills. And, that was that. After that, I went for a cultural interview, cultural fits interview and yeah, that was with, the wider team, the senior developers and the team. After that I was offered the position.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Well, I think technically, the advantages that you can see what you can put a base level standard on the applicants that reach the second round of interviews, you will know that they have the competence to at least complete like that technical assessment, because obviously if they don't, then they don't get to the second round. In that sense, you have an assurance that the candidates that do make it to the second round or have a certain standard. Obviously apart from that, I know that a lot of other companies do some technical in-house interview, a whiteboard thing or something along those lines, which is also, to see the extent of the problem-solving skills of the candidates, which obviously the advantages that you get to see how well the candidate will perform before even offering them the job. After that, the cultural fits is obviously important from a, just from like a working dynamic, like a team dynamic perspective. Yeah, I'm sure there's value in all of them.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: The conditions that your boss to perform the tests, maybe not specifically like a take home test, cause that can be more comforting, but, or more comfortable rather, but say you do like a technical test in house. Obviously, there's a lot of pressure on the candidates and that's not really a fair reflection of how the workplace will be. They're not allowed to, use any outside resources and that's also not like realistic. You will, you as an engineer, be using a ton of external resources and doing a lot of research. I think to expect a graduate student to be able to do all of these things without access to the, third party resources is a bit unrealistic. I think it cuts down on talent that may have performed very well in the job, but doesn't test well under those conditions.

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: I think, for instance, in Company 4 there's a three-month probation period where they see how well you perform. After that they either extended or if they're satisfied, just like suspend the probation period, and you just a full-time employee at that point. I think in terms of trying to suss out your competence on the job, I mean, my manager checks up on me every two weeks. We have a one-on-one and that's always, I'm a big fan of that. It's just nice to touch base with him. Work-wise personally and, or, and that's it. I suppose from that, he gets an idea of how well I'm doing and the level at which I'm performing and what are tasks he's thinks are good enough to give me. What tasks he thinks are like too easy for me? Yeah. I think, that's definitely something that Company 4 does well and correctly, all these like one-on-one meetings where you really get to go in deep with the employee and sort of figure out what's they, probably how they're doing at that point. And, you know.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: So, there's a thing. We use a quarterly review system, and that, like my manager will write, like, he'll rate me in terms of my performance and also give me feedback on how I've been doing and what I've been doing well, what I need to improve on and what he hopes I will achieve in the next quarter and that sort of thing. I think that's the closest to a pure indicator, but obviously there is no way to put a single number on somebody's performance also.

INTERVIEWER: Are there any training or development programs set up for you?

RESPONDENT: Given by the company? No. I think, my manager specifically has sort of like guided me in terms of giving me gradually more, yeah, graduating more challenging tasks to ease me into it. It's closest to it, but not a formally, not like I wasn't given any formal training per se.

INTERVIEWER: Okay. So, so over time he actually gives him more responsibilities and harder work?

RESPONDENT: Yeah. Yeah.

INTERVIEWER: Okay. That's fantastic. That's it? But before you go, I'm going to stop recording and then I'd like to chat to you just after.

RESPONDENT: Sure.

PARTICIPANT 11

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: What skills are lacking? so it's so are you speaking for, technical? I can comment on technical. Okay. Okay. So non-technical. Okay. Mainly I support engineering and product departments, and a lot of the, we receive a lot of CVs of, graduates. The shortlist is basically made on, a few different criteria. You have to look at, employment equity requirements of the company. So, and that's based on demographics of each province. The other aspect then is qualification. If it's related to the skill you're trying to hire or to fill the role with, and then they don't have any experience so the lack is the lack of actual hands-on experience in the workplace. The, the main aspect that you would look for then to make up for that is the determination and that drive to want to learn a new skill and to succeed, to be able to succeed in that environment.

Did I answer the question?

INTERVIEWER: Yes. The one lack is the lack of experience. If you can maybe broaden, when you said lack experience, do you mean in the workplace? So commercial.

RESPONDENT: Like we usually say like lack of commercial software development experience. They've done it maybe over the last three years in the degree computer science, or whatever it is, but not practical hands-on experience in, an environment that's, scaling and taking things to production. In that sense, they haven't had the experience, coding and taking things to production.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: Quality graduate? So, qualifications of a graduate, obviously someone who's graduated, I don't necessarily look at, Institute because that I think is quite bias to say, I'd want someone from this university as opposed to that university. The curriculum is the same. So, there's no preference to specific universities. The main aspect would be then again, lacking of the experience. The ideal candidate would be someone who's got some hands-on experience, whether they've dabbled with it on their own, done some work on their own on the side. That would be the ideal that person would have the advantage, is that they've got the degree and got some experience by taking up a part-time job or something on the side.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: Okay. Essentially someone who's driven and flexible, someone who's willing to learn and someone who's willing to, keep a very open mind about things. So, the ideal candidate would be

someone with great enthusiasm, that goes longer than, actual experience sometimes because that person has such determination to learn this, that that individual is going to do whatever it takes to make this work. It's easy to say hard working and, integrity in that everybody in my mind is hardworking. It's just, that personality to be able to take on certain roles. Again, it's different roles, different characteristics, a sales job. I would need someone who has good communication skills, someone who's approachable, someone who, also very driven, to succeed in that role. So, yeah.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: The critical skills on our end, or that they wouldn't meet basically both ends what they would need. Let me just think about this quickly. Yeah, sure. I just wanted to see if I can find one of our grad program job specs for you. So, for the technical, for the grad program on the software engineering side for, they would essentially need to have a degree in the related field. So, BSC, bachelor of science degree in computer science or bachelor of engineering degree in maths mathematics. We generally look at people with like good computer science and mathematics background, and then strong problem-solving skills, strong communication skills, and then strong understanding of object-oriented programming languages. So that's universal. It's not like specific to a language which then doesn't give everyone an equal opportunity. The degree would essentially teach them object-oriented programming languages, and then we required them to be well-versed in that topic. There's a lot of theory-based questions. Even though they haven't gained commercial software development experience, there are coding exercises during the interview process.

They will be tested on the coding ability as well, if that makes sense.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Okay. Okay. We use, application tracking system called Greenhouse. It's this company US-based company that, all of our CVS come in to our careers website and everything's tracked through this application tracking system called Greenhouse very popular, quite a few companies. I've seen in Cape town as well use using Greenhouse. Greenhouse then allows for you to, set up the role as you see fit. Now, Company 5, have a hire a lot, policy called hire a lot, which kind of gives you guidelines on how to standardise that process. Pretty much everyone that comes into the business goes through a similar process. Obviously, you tweak it accordingly, but generally what you want is a candidate to go through a three-interview process at Company 5. Once they saw as the role is set up on my side, and I'm happy to share my screen, would you like me to share my screen with you? Okay, cool.

I am busy setting up a role as we speak. Let me just figure this out now. Share screen. Oh, there we go. Share screen. You need to, it says host disabled participants screen sharing. You would need to give me permission perhaps. Yeah. Perfect. Yes. Perfect. Okay, perfect. So, I am busy setting up a role as we speak it's for a software engineer, Android role. It's a mobile development, for our logistics, Company

5 logistics team and, the role is still being set up. So, here is basically showing you different aspects of the role sourcing within allow me to add different agencies to the role. Approvals is where I would, essentially add the budget for the role and then the job setup itself. There's an interview plan. So, this is the workflow. Here you get application review. That's where your CVs come in. We have a stage called team screening.

Basically, if there's any CVs that I think are suitable. I would, the recruiter would essentially screen in application review stage. If there's anyone that I'm a hundred percent certain of, then I move immediately to interview one. If there's something that I'm not sure about or need some guidance, I moved to teams screening stage, and this is where the hiring manager, the owner of this role would essentially look at the CVS that are sitting in teams screening and advice from there. From there, the candidate moves into interview one, which is theory-based, interview two is more technical based and then executive, which is a bit of high level, technical and culture fit. Then we have a session called debrief. It's a final panel review, and decision stage. So essentially all six interviewers. There's two per interview, which would meet for a quick 15-minute, panel review, where we all in the same room, all on the same hangout call just to discuss the overall experience with the candidate and the interviews.

And, if that is positive, we moved to references and then finally to offer stage. Now there's one step that's missing on this road, because we don't have, assessment, but generally our other software engineering positions, especially the grad role, there's a HackerRank, technical assessment stage. That will be after team screening before the interviews. There's an assessment stage. That assessment is, then we use something like this HackerRank. HackerRank will then integrate with Greenhouse and, everything that happens on HackerRank, we'll pull through those results. We'll pull through. You can see we've had over the years, 3,128 people doing our tests, these in the last three to six months, at least you can see, which are the ones that passed, what are the scores a hundred percent. You will find a lot of them are quite junior. The grads do exceptionally well in the test. It's a lot of theory based.

It's a lot of thing. They are one or two that are flagged with, plagiarism. So that's picked up as well. If they, like ja I'm just giving you a quick scroll over the test, there's different sections and, we kind of pre-set this up, but then HackerRank, doesn't throw the same question. So, it will rotate and provide different. It's not the same sections, but then different questions. The sections would be algorithms, computer science fundamentals, data structures, design patterns, and then ja, further stuff to make up for those marks. And then here you would be able to see that the first few questions are multiple choice out of five. Here's a multiple-choice question, the first few. The last two questions are coding questions out of 50 marks each. This individual, passed with flying colours, and there was no, plagiarism that was picked up from this individual.

So, yeah, I know it's a lot. Just stop me when you need me to stop and, I can give you any more information whenever you need.

INTERVIEWER: That's fantastic. Actually, I wanted to thank you for taking me through your screening process because that's exactly what my thesis is about. The actual process really.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

RESPONDENT: Sure. So, the first step would be the HackerRank test and that one is quite highly ranked in that we make the decision on that first stage. If you don't pass the test, then there is no moving forward. That's the first step, which is quite important. If a grad is not passing the test, which is pretty much like a university test, then it is a bit of a worry for us, because, like I said, a lot of it is theory based. The coding questions also pretty much covering what they have covered during their studies. We have, kind of a grading that we've determined for ourselves. Anyone that gets us the test is out of 150, any one that gets a hundred and above immediately moves to the next stage, anybody that gets between 70 and a hundred, I will grant them an additional 30 to 40 minutes, to improve their test because it shows that they almost there, but they probably ran out of time.

I'm willing to give them more time to improve on their work. A lot of times, actually, most times they just immediately, the scores just shoots up to like 90% or so, because they just like ran out of time before they could, implement that solution or, hand in that solution. So, so yes, then we give. Anyone below 70, out of 150, we decline. They don't move forward in the process. Once you make it through the interview process, they are two interviewers per interview and, each interviewer, there's an interview kit in that kit is scorecards based. The scorecards are based on the requirements on the role and what they need to be testing. There's a whole database of questions with different sections that we cover. And, they need to answer, correctly, if not correctly, we're not looking for textbook answers. We also looking at a person's logical thinking process.

How does his mind work? How does he get to the problem? And so the interview is then have to use these skills, not just by yes or no. He marked this right, he got this right. He didn't get this right. You have to really gauge whether this person knows what they talking about. If they on the right track. If both interviewers say yes, then yes, we go to the next stage. If one interviewer says yes, then we also go to the next stage. If both interviewers say no on that first stage, then no, but that candidate does not move further. We followed the same process in the second one. Again, if there's mixed reviews, we move to the next stage. If there's both interviewers saying no in that stage, then we don't proceed to the final stage. Yeah.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: In our case, we lucky in that we receive a lot of applications. So, if I open a role on a Friday by Monday, there's 300 CVs in that role. And, it's quite time consuming to put all of them that look right through to interviews with engineers, whose time is also valuable. An hour a day of an engineer's time is time taking, taken away from the business. You can't always, put every single, I mean, what if I receive all 200 grads out of those 300 or 200 computer science grads, I've only got 10 grad roles or 15 for that year. The graduate program is 15 graduate rolls. I've got over 300 CVs. The test in

a way does streamline that process to a certain extent and then, gives us the strongest applicants to go forward with. We then further take it further by assessing these skills interviews as well.

The test does then, at least bring that number down quite a bit.

IQ 1.3.2: What are the disadvantages of using these screening tests? Not answered for graduates

RESPONDENT: Disadvantages is that you get senior engineers who have been doing this for years in the business, being a software engineer, software developer, and they sometimes don't see the need of having to do an actual physical written test because they interview better than doing a test. You, and they also not going to remember every theory-based stuff that they covered during maybe university or perhaps didn't study. And they self-taught. In that respect, you lose on some good engineers, because you've just, push them through to a test stage instead of having a initial conversation. What we try to do in some cases is when a senior engineer, we identify a good senior engineer, who's going to be quite a good fit for the business, similar technologies, working in a large-scale environment. Instead of doing the test, first, we do a quick interview with the hiring manager who will be able to provide some information on the role.

Again, we quite big stickers to the, of sticking by the rules. We, they will still have to do the tests. There's no one that goes past without doing the tests, unfortunately, because we don't want to even have a case where it seems unfair that this person came through the business and he didn't get to do the test, which everyone else sees. We then explain the importance of the test and a lot of the, it's the problems that our engineers are dealing with on the floor. So, which is why the tests been covered some of the stuff. Yeah, we still require them, but yes, we do use, there's quite a big drop off on test stage because not everybody does wants to do the test. Quite a few people we send the test to, we just never hear back from them.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: No, except for if it was plagiarism and we didn't pick it up or we didn't, but generally HackerRank will we'll flag someone who's copied because that's the only instance where someone's now, lied about their technical ability. No, we've never had the case where the test, ja. We never really had that instance.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: So, there's guidelines from human resources department. Firstly, you would try to assess, what they would do is grade a role. So, to grade a role, you need to, a grade is attached to each role and level. You get skilled, semi-skilled, professionally qualified, and with each level there's a specific salary or benchmark salary that's associated with that level. How would you then determine that is someone okay with a degree perhaps and 10 years' experience, should, would these responsibilities should be earning at this level at this grade? So yes, we get the guidelines from human resources and then the hiring managers as well, we'll say, okay, this is what I need. I need someone with, at least two year's experience with Android studio experience or, native experience and they give specifics, but then HR always assesses if what this and this speaks to like the budget and the requirements speak to each other, like you can't have a budget of, for, intermediate role and then put 10 year's experience and a PhD requirement because that's not fair.

You, you want to pay this amount, but you want a unicorn, so that's not fair. There's always that assessment between hiring managers and HR. I would, assist with the spec, but it will always get checked by HR at the end just to make sure everything is aligned. Yeah.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: Characteristics? A lot of times, I'm not going to say, I know that the answer to that a hundred percent, but I would assume it's based on characteristics. Yeah. That's a difficult one. I won't be able to answer you that because if I say that the characteristics are based on individuals who are successful in the role. If you have a software engineer who's doing exceptionally well, then you want to try and mimic that and try. And, but then that's always not advised to try and get similar people, all the same people in the team either. I think the characteristics will be based on the environment. If it's a fast-paced environment, then you need someone who is flexible and willing to, here things change every week. Today they doing this, the roadmaps completely changed next week. Are you willing to be flexible? Not a lot of people like that it's one day this, the next day it's changed and the product manager, a lot of times holds that cards in their hand you know. Sometimes the director would say to me, engineering directors, engineering, team leads, and then software engineers below him. He still stays that, jeez, I'm in this role, but the product manager still makes quite a bit of the big decisions here. I'm almost like an advisory and the product lead is, holds quite a lot of cards in their hands, on what goes forward.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: So, like the talent. Myself and the hiring managers, we've got a standardised process already. We just duplicate that process throughout the different roles. We've already done the work a while ago, where there's a database of questions where there's the tests already set up. Every time we

open a role, we just utilize the same stuff, but the hiring manager. So, so basically those hiring managers are engineers who have done the job themselves. They will put together tests that are aligned to our environment or to try and get the best out of what we need in our environment. So, yeah, so those directors, engineering directors would be responsible for putting together those tests, the hiring managers put together the list of questions he wants to use in the interviews, and so forth.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: In screening tests? So, in other companies, I would think they probably utilize HR a lot more. In engineering, doesn't seem like they do a lot. It seems like a lot of that decision-making is made by the engineering directors who are those line managers and hiring managers themselves. HR provides a, are you doing this, the proper code of conduct. If you, it's nothing that's bias or there's nothing that's really, untoward towards anybody. That kind of thing, but generally the questions itself, a lot of it in engineering or the, if the areas I've supported, it's the hiring managers doing the majority of it.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: Who decides, I mean, that CV that comes into the pipeline, the first person that looks at it is me. There's nobody else that hiring manager doesn't even get the time to look through those 300 CVs, which is why the recruiter then is there to streamline and try and get the best out of that. I would identify based on requirements of the role. I would look at the requirements of the role and then look at the candidates CV, and try to read as much into it and see if they meet the skills that we're looking for. I would say at that point, it's me, the recruiter that makes that determination of who gets the test. If there'll be clear guidelines, like the role requires someone with five year's experience or three to five years, experience someone with one year experience, six months automatically don't qualify for the role.

If we have a junior role. Yes, sure. If it's a senior intermediate role, there's the business can't afford to take on a junior. We have to follow those guidelines five year's experience. Yeah.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: No. The test, so different roles have different tests. So, but I mean on the software grad program, it's been the same test, that we do, throughout the process, irrespective of what Institute you come from, because it's not language specific. Our test allows you to do the coding questions in any coding language you're comfortable with. Even if you're not proficient, we are Python house, but we don't require you to do the test in Python. You could do it in C-sharp. You could do it in Java, any language that you're comfortable with. It's not specific to, to language. There's other roles that have different tests, like the QA analysts wouldn't do the test, the software engineer would do they have their own tests. Each area have their own tests as well.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: They go into firstly, eight weeks of intense, intensive training. No, they're not doing any project work, nothing. It's literally like being at university where our engineers, they're in workshops and they do lectures on different. Yes, yes. You put them in these rooms and auditoriums and we cover section upon section of the different technologies. You'll have the mobile team covering Android, iOS. It's a whole maybe day or so of intensive training on that specific area. We do that for at least the first eight weeks of intensive training. They also exposed to, the different teams. Throughout that eight weeks, each different team comes and showcases what they all about because essentially, they want to grab the best grads as well. So, everyone comes there with the, with what they have to offer and the mobile apps team will come and say, this is what we do. And, and at the end of the grad eight weeks of training, the grads have an option to choose which team.

So, we give them an option. Yes. We tell them, okay, now that you've done this training, you've seen what every single, the logistics team, they do the calculations of estimation of how long the drive is going to take from point A to point B. This is what this team does and so forth. At the end, they get to choose, make a recommendation of which team they would like to join. It doesn't always end up being exactly as they want, so they can have to give us like two options or so, and then we have to select and put them. So, again you can't put all five grads in one team, you've got so many teams, have you got to like spread them out. We also, then you assess, which are the strongest ones in those specific areas. We try to place them where they need to be or where they want to be.

We've got machine learning teams and we've got, the QA teams', automation. Each one then we'll choose at the end of the eight weeks where they want to be. We place them into different teams and they basically permanently then employed on that, in that team. They start working on projects and doing a bit of deploying on a daily basis of, and then that team lead, I would assume that manager would have to assess progress and have the constant one-on-ones and, up-skilling and all of that further up-skilling, if there's anything needed and then that's assessed, I'm guessing on a quarterly basis.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: What metrics they using to test? I'm not sure on that. Yeah. I'm not too sure what metrics they use to evaluate someone. I think that would probably be the HR person that would probably be able to give you, because remember my role is very, not full-on HR. I'm literally technical recruiter, making sure these people come in the door and then I hand over, as soon as they come into the door to the next person who then, is responsible for performance, reviewing and stuff like that. So, yeah, I don't, I won't be able to comment on that.

You don't know of any development programs setup, no.

Development program. This would essentially be a development program. What do you mean? Oh, like further development if someone's falling short on skills and stuff. Yes. There's very clear, processes that

have to follow through, you can't just say, oh, you're not performing and that's it. You've got to make the effort to help that person. So, it did it, I guess it depends on how far you take this. I'm guessing that the team lead will speak to the member of the team. This is your performance. It's not completely up to scratch you on a score of maybe out of one of, out of, four you on a score of one or two, which is, not too good. You want to kind of aim for a score of three and, this is what you need to do in order to get this and how can I help you? And let's see, and then few weeks later let's re-assessed.

If it goes on to the point where that's not improving, then you do, they do involve HR and then HR, and then it's proper performance. Whatever it is, I don't even know what you call it. Yes. Yes, then they'll go through it with HR and then there'll be proper steps that must be followed.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: At that point, that will be the part where HR will be able to give you a few steps and perhaps the HR business partner. So, someone who's been doing this often over the years and have had to deal with lots of the stuff? I don't get involved in that aspect but there is definitely a process.

PARTICIPANT 12

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: Very interesting question. I find, especially with me, because this is my first year working as a software engineer as, what I learned at university is a little bit different to what I do in the workplace. So, yeah, you could argue that the only thing I learned at university is basically how to solve problems, but not necessarily, the technology we're going to use in the workplace. For instance, I, one of our major tech stack at the moment is PHP and our vote, and I've never written a single line of code on PHP before. Getting that, like you have to learn the new tech stack and then you also have to then, working in a team and being part of a team and also learning to review other people's code as well. That's yeah. That's very interesting. Yeah, I suppose what you take out of university is how to solve problems, but then yeah, so then you have to apply it when you get to the workplace, but the tech stack is entirely different to what you used to.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: Well, I am a graduate, so I'll have no idea to be honest. Yeah, I suppose I would think that the quality project is someone who is not afraid to learn new things. Cause that's really, what's going to happen when you get to the workplace, everything you'll be doing will probably be new, pretty much new to you. You have to embrace that you have to spend lots of hours learning new stuff and also be productive as well because yeah, you can't not generate good code because you say "I'm still learning" so you have to put in some extra hours to learn and also deploy code into production. Yeah, I think a quality graduate as far as I'm concerned would be someone who's just keen to learn new things.

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: I suppose, being able to solve problems. So, when I applied for, Company 5 isn't the only company that I applied for, and also had to write a test online there. Yeah. The questions that they ask are fairly similar in, so yeah. I had to practice solving problems on data structures and algorithms that's yeah, that's always. Well, to solve the problems that they ask you have to have some background on data structures and algorithms. Without that, your code is not going to run on time and you're probably not going to do well on the test. So yeah, that's my take on it. Like just practicing.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Okay. Yeah. For Company 5, I got an email that I have to take an online test on HackerRank and yeah, I think I had two weeks to take the test on HackerRank. So, yeah, and I had two weeks to take that test and I mean, when you get an email address, it's always nerve wracking because you don't know what questions to ask you. There's also the chance that, like, what if I am not good enough because I think for the first time you have people judging your code, like, based on, is this person good enough to join our company? And yeah, that's always nerve wracking, so yeah, it's just, yeah, so that was the first screen. I think they asked. So, there were two problem solving questions. There was one question that was just like, I suppose, knowledge-based questions that they asked about, for instance, they asked about the extra tippy verbs, like who to get et cetera, like one a day.

Yeah, so that would be the knowledge base questions. And then there's two, problem solving questions. Yeah. What's the last. Yeah. And, after that I got an email that okay, I'm onto the next stage. The next stage was a first interview, which was somewhat technical, but not really technical. It was just like a conversation getting to know you, if you going to fit into the team, et cetera. The second interview was, quite technical and then the third interview was with the CTO and Head of Engineering. And then, yeah, that was that.

RSQ 1.3: What are the advantages and disadvantages of by using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Okay. I, so I suppose the advantages would be, ideally you get someone who knows how to code. Also, I think when you are busy writing your code, HackerRank will record, well take a screen recording of what you're doing. I think when you're doing that, it'll just show the hiring managers, how you solve problems, or how you approach a certain problem. I suppose in that there is some advantages in that they getting someone whom they've seen, write the code and they can solve problems, I suppose. Yeah.

INTERVIEWER: Okay. What, so you saying that the advantage when you presenting the test, can they see your screen? Is there a video?

RESPONDENT: No, there's no video. I think there's, I'm not entirely sure, but I think there's a recording of your screen. Like, yeah, they can see what you're typing on the screen, but there's no video. It could be someone else doing the task for you. Yeah. But it will be shocking, but still.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: In particular with the HackerRank thing, that test is timed. I think the, I can't remember what time would give you. Well, I think they gave us about 19 minutes to do all three questions. The disadvantages is that if you are not quick enough, I mean, there is a possibility that you can solve the problem, but you're not picking it up. Also, you could come up with the problem that doesn't run say in linear time. It just overruns the time and you don't get back the results in the time that you're supposed

to. So, you have to refine that. Yeah, so that is potentially a waste of time. If you are good enough to join the company, but you are not quick enough to solve those problems, that becomes an issue, so they lose good candidates and yeah, it's also demoralizing when they cut it's as well if they get back to them and say, oh, sorry, you didn't make it. You know, so yeah. I would say those are the disadvantages. There's a potential to lose good candidates there and so on the flip side you have people who will then practice it, solve those problems. Like all they can do is solve the problems, but then there isn't that work ethic. And so, once you have someone who can solve, and non-classical problem, like how many ways can one fill a swimming pool with balls, which now you will never get in it in the real world, but, because someone has practice or has seen that problem, say on lead code, and they're seen someone solve it and then they can just solve it there, so yeah, it has its disadvantages and advantages.

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: The process after I was employed. Ok, so there was still a, so I joined with a group of other people as well. I think there were six of us and still what happened was we had a project, which we did for about a month and yeah, so we do that project. After that project, we moved to different teams basically, and then joined the different teams and we were then our part of a team. We started off as a grad group of six people, and then we solve a problem or solve a problem. We do a project a month, and then, yeah.

INTERVIEWER: Okay. How do they evaluate you on that project? What did they do?

RESPONDENT: So, there was no individual evaluation. What happens with the project, I suppose it comes down to how Company 5 work in general. So, it is an agile development environment. What happens is, every day we have a meeting, it's a stand-up meeting. In that meeting, we talk about what we did yesterday and what we're going to do today. Each person has a ticket that they have to complete, given us certain time. That ticket obviously contributes to the project. Like if I am to say create a class for users, for new users, then that's what I would do. Or I don't know, excuse me, for however long it takes me to, oh, so for. We also, each ticket has a story point. A story point is an estimation of how long it should take a person to do that ticket.

INTERVIEWER: And the complexity. So, complexity and time.

RESPONDENT: Yes, exactly. Exactly. So, yeah. With that ticket, you have to finish it, obviously, according to that story point. After that project was done, because we all would have contributed because we all had tickets, et cetera. We presented our projects to, to the entire engineering team. Engineering and product team at Company 5 and yeah. Each one had some contribution that they had

to talk about and the application that were made. So yeah. There was no individual evaluation of the person, just like how we work as a team, et cetera.

INTERVIEWER: From there, after that review of your work you were then placed into various teams?

RESPONDENT: No, there was no review of my work. My team members would review my code on GitHub and then approve the changes that I made and then push that onto the master branch. What happened is I was like, so they gave us, I think it was six spaces for the different teams, like, okay guys, these are the spaces available for the teams. You decide which team you want to join. Yeah. You decide amongst yourself, yourselves, which team you want to join and if there's a clash somewhere, then engineering, well, the Head of Engineering, will just sort it out and then just push people to do whatever team he wants.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Okay. It's very difficult to answer the first question because yeah, I don't necessarily have KPA's so what happens is that I get a ticket, basically like a work project, I get a ticket, then I have to finish it. We have two-week long sprints. At the end of the sprint, I have to demonstrate what I have done to stakeholders. So yeah. We get tickets to do and then demonstrate that to the stakeholders and yeah, I suppose that's how progress is measured if the team is progressing and if they're, yeah. If they're developing new stuff for Company 5. And so, training measures, we just, we have, this thing called My Academy and it has a few, well, so it has some learning platforms on it. Quite a few of them, one of them is Udemy. If there's something you don't know, then you just go there and then you sign up for and your search for whatever course you need to learn and then you just learn it on Udemy or whatever other platform you prefer. That's on My Academy.

PARTICIPANT 13

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: Myself being a recent grad, I think skills that are, that I found that I've had to learn, coming into the workplace is things like the workflow of how things actually work in a company. Things like sprint planning, defining actual problems, because I think coming from university, you don't actually get experience in that you just given tasks to do, things to do, and you don't actually have a proper workflow in that as in how things fit together and all of that. That's been sort of a challenge in getting to, get used to, workflows and planning and things like that. You're not just given a task and complete that you actually part of a bigger picture.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: A quality graduate would, I wouldn't say is the smartest person or person with the highest grades necessarily. It's just your willingness to actually learn and be open to new things and new skills. I think that's what gives more quality and also your ability to fail, I guess. I know a lot of people who are quite smart, but when they struggle, it's quite difficult for them. You actually need to be able to fail and, push through, work through, find solutions. Basically, just your ability to, find your way through on your own.

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Critical skills as in like you, I dunno, can you maybe explain it?

INTERVIEWER: Maybe, so technical and non-technical what skills do you think the need in applying for a position?

RESPONDENT: Technical, I guess you have to at least know your languages, know your theory, that you're coming with. Obviously, it's impossible to know everything, but you need that ability to find information and find solutions. I think that's an important skill to come in.

INTERVIEWER: And any non-technical skills that you can think of?

RESPONDENT: I guess you need people skills in the workplace as well. You need to be able to communicate with people, to work with others, work in teams. You need to be able to ask for help. That's something that I've learned now as well. Yeah.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Okay. That the screening process I went through? They start off with obviously, they screen your CV, your results, and then you get invited to a first interview, which is your personality interview. So, it's just a basic conversation. They want to know your personality, what you've been doing, what you're up to. You tell them a bit about yourself. If they think you will fit in with the culture, then you go to the next interview, which is a bit more technical. They'll dive more into your technical knowledge or ask you a bit more technical questions. Oh, sorry. Before all of that, I forgot the actual test that you do. You first, when you apply you first do your HackerRank test, and then once you pass that, I'm not sure what the passing requirements of that are, and then you move over to obviously the interview session and then if you make it through all of that, your last interview is with the higher-level management. That's the engineering manager and the CTO, the chief technical officer. Yeah. After that, they'll make you an offer or not.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: I think the advantages are, it that actually tests your technical ability with sees, it tests what, because you get to choose the language that you do it in. It tests how well, because obviously you're going to choose the language that you are best at. It's going to test how neat you code in that language. How good your knowledge is because there is a time limit on it as well. And then there are theory questions as well. But theory questions are quite difficult. So it tests how well you actually know your book stuff as well.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: Personally, I don't think it's a true reflection of what you can actually do because you're given a set time limit and a set task. You might not be that familiar with the task that they give you. Like, I remember when I did my tests, one of my questions were linked lists or something like that. I've probably never done that or done it in my first year and completely forgot what that was. So, I would be able to complete the question, but maybe not in the 45-minute, time. I think that was a major disadvantage as in that test would only show, I didn't know how to do it, but it wouldn't actually show that I have the ability to actually do the questions given the opportunity. So, I think it's a bit, maybe I wouldn't say unfair, but that's the difficulty in doing that. Yeah.

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: The program that we were employed for was a graduate program. There wasn't hectic requirements, or it wasn't the high expectations of us because the first month they basically took us through the company, showed us everything. Almost like it's almost like a learning program because Company 5 is very learning oriented. They didn't really expect us to know a large amount of like, they wouldn't just throw us into the deep end. It's more of a learning experience. Even now, if I don't know anything, somebody would take me through it like, okay, this is the steps in doing it. I wouldn't say there is a very basic expectation of you, and there is the expectation that you are willing to learn and improve your skills and, just keep up in that way.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: I think the way that they assess your, actual, progress is so we, each task is given a certain amount of points. Obviously, they'll assess how your points increase over the week. You might start off with only finishing four points per week or something like that. Obviously the more senior people complete like 16 points or something a week. I think that way they assess you progress in the company.

INTERVIEWER: And, development or training programs.

RESPONDENT: We, they do have, development and training as in we have access to you Udemy, free access to Udemy. And, what's it called? It's a Naspers training site.

INTERVIEWER: Not Plural, no?

RESPONDENT: No, I can't remember exactly what it's called right now, but on there is Udemy and various other courses that you can do. Also, every second week we have what they call hack days as in you get the first, the way. So, you'll plan the Wednesday. You will bring up a topic that would obviously benefit your team or the company may be, so you would explore a new technology, new language or something that we could maybe implement, and then you take the Thursday to investigate, explore, learn, and then you'd obviously report back on what you found. We decide, okay, maybe we should give this a try. Maybe we should move over to the system. So, in that way as well.

PARTICIPANT 14

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: Ok, so I think that is quite a common question that I found within the industry. I think that, what graduates are lacking in the workplace is not so much the knowledge per say or the theory side of things or at least in my experience but I think they lack the practical side of things when it comes to software development or just IT in general, so I don't think it's a competency thing in terms of understanding but actually applying what you understand is what I've seen that is lacking.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: I think it ranges from having a balance of skills and then obviously the, I would say it's between the skills, soft skills and just then a balance of the knowledge over all. So, I think if somebody has the basic competency, they have the theoretical knowledge around it but then on top of that their attitude and their soft skills, communication as well as the behaviour they have, so if they are very forthcoming and positive, I think that that's what makes a quality graduate.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: So very similar to the previous answer, we are always looking for a balance in terms of what we are looking for in a graduate. They don't have to be the best in the industry because it's unfair to expect that of a graduate especially if they've never yet had the opportunity in the industry. We all had to start from somewhere so if their balance is between again having a positive attitude, showing eagerness and a willingness to learn as well as balancing the act of knowing what they have studied and using that basic knowledge and skill set to help them and basically build upon that because I think it's also unrealistic for companies or businesses to expect out of the bat that the graduate is going to be a seasoned expert from the time they leave or from when they leave their studies and are coming into the actual industry. I think that gap needs to be a lot realistic because when you do take your concepts, this also depends entirely on the qualification and the determination of the graduate they could've gone beyond the basic requirements within their studies and that just puts them a cut above the rest. I would say a general blanket statement is that those that do come into the industry are still new and they need to be given the opportunity to apply the knowledge that they've learnt from a basic point of view because I see like, what you study, from my side that has been through the tertiary education process and still am in this after 12 years, it requires constant learning so once you finish that point you have to keep going and push forward. So, I definitely think grit and a willingness to keep learning are two of the most important characteristics that I would look for in a graduate.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: I definitely think that obviously having, the basics of computer science, is needed, that from a knowledge perspective, and just from a, industry skills perspective, they need to know that, I think that's a blanket approach that we all look for now, within the industry. Definitely on top of those two hard skills, I would say soft skills is a definite. Being able to, be worked with a team, be open in terms of communication, being proactive. I think that would also apply as a critical skill. Obviously having, EQ as well. As much as your IQ applies, your EQ emotional capability should also be there as well, because as we move into the, into this whole remote working, because of COVID, it's just accelerated the industry in terms of how we work remotely now. We only predicted that would have happened in a couple of year's time, so not too far away, but with the pandemic has really accelerated that future prediction that we add in the industry.

I think, with that comes the importance of having, soft skills, which is being able to communicate, speaking at certain levels with employees and clients alike, I think, that's a definite key thing.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Sure. It's we, the kind of process that we follow in terms of screening. Ideally, we used to reach out to agencies, but we just found that dealing with agencies, hiring agencies, we haven't gotten the proper reception in terms of quality candidates. So, we've basically brought that process internally. We'd largely, ask for recommendations or we will, we'll do the process of finding CVs ourselves, from there obviously HR is involved from that process. I, as head of engineering, I'll take a look through the CVs, Ill largely look at if candidates have any previous work or current work that they're doing. Do they have any GitHub repositories or Bitbucket repositories? Do they have any side-line projects? And that kind of thing that I look at throughout the process, because that gives me before and, exactly what the candidate is doing and what if they passionate about what they're doing, and that gives me a good sense of how engaged they are with what they're learning and what they're doing from there, if the candidate is suitable, I'll then email the candidate or call the candidate and then, process a, interview.

Before they physically come in for the interview, ideally, I'll ask the candidate either provide source code upfront or projects upfront, before that process happens, as well as a small programming test. Once they've gotten through that part, it will then be the physical interview. That interviews are mixed again between technical and soft skills as well. If the candidate passes that step, from there, bring the candidate in again and then notify them that, they've been successful within the two steps of technical and soft skills testing. They should then engage with the future team, and then get a sense of what the team members feel for that candidate. If the team members feel that the candidate is suitable from there, I'll then complete the process with HR to then incorporate an offer letter and then hire the employee. If

the candidate does not get along with the team, then I'll inform the candidate: Unfortunately, they don't fit with according to the company culture.

Vice versa, if again, and it does not pass the first two steps of technical and soft skills, then vice versa I'll inform the candidate that they don't meet the requirement to fulfil the position.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

RESPONDENT: No problem. I'm all for collaboration in speaking. So, if people have points, go ahead. Yeah. Indicators, obviously that approves a graduate for employment. So, again, it's the soft skills along with the actual hard skills of competency, basic competence. It doesn't, it also depends on the role but in this specific case, it's graduate. As long as there's basic concept of understanding in the field and the technical capability, as long as, coupled with their soft skills and the attitude and behaviour, we should be positive. I think that's definite success indicators because you can always improve upon the candidate, offered him the opportunity to, and from there, they need to understand that they have to grow. It's not a senior role, it's not a middle level, it is graduate. That means they have to be given the time and the room as well, to prove themselves at the same time.

One can't be too pressing on a graduate. My view, at least.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: I think the advantages is, it just allows to be able to gauge where the graduate is in terms of competency. They don't have to be complete experts as long as some of those questions are answered, with, in terms of software development or whichever role they're fulfilling. I think that just gives us, as hiring managers to be able to decide, okay, the candidate is either on par above average or below average, and that just helps us weed out of all the requests or candidates that we do get. It just makes the screening processes easier because at the same time, as hiring managers, we also, I would say not just for my role specifically, but I think for anyone that's working in the IT space, is that the day-to-day responsibilities are fast-paced and very deadline driven. So, for us time is critical. I think the screening also helps from that perspective is with regards to time.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: That you never know if what the answers you're getting are really accurate. There's no real way to test that point yet. I mean, at least we will wait for AI to give us that kind of accuracy, but at the moment we don't know whether, the work you gave him receiving his like candidates work, or even the screening test itself, whether they are answering accordingly. I think that's where it comes in, where we do try and have in the third step to have those face to face and follow up with another technical session and having that face to face. Because I, I think that having the candidate within the room and

asking those questions in real time is still unmatched at this point in my view, because you get to have the graduate in real time, explain to you the concepts and the problems without actually having the time to Google something, find, check, what the answer is.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: I think the success rate has been 90%. I just, I know that in one of, in my team, I have a graduate that walked this path. And, I think, he's done really well also at previous companies where I've managed other teams as well, I've taken graduates and I've always followed this process, throughout my career and it's done very well in terms of the screening and soft skills. And, and so I found a good success rate. I think there is that 10% where I have had failure in terms of hiring. That's not just from a graduate position that goes all the way up to senior level where I've missed the mark in terms of gaining accuracy in the right employment or that I person for the job.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: So, I do so coupled with HR. HR will initially write the briefs, but, as the one who knows the positions and who's hiring for those positions within my department, I always have oversight in terms of what the brief should look like and what the job description shouldn't be like.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: So, I, as head of engineering, obviously jot down those characteristics required for software dev. I based this largely off industry practice, what we've seen also with a little bit of personal touch in terms of what I've over the years being in the industry, but largely it's been based on the industry's version of characteristics for those roles. You also find that after a certain amount of time, it might be some other things that you would look for from a software developer, but again, it might be different for another head of engineering in terms of how they would source that.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: So, it would be myself and then definitely involving my senior developers.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: HR largely deals with the communication with the graduate, any legal and paperwork with regards to labour laws and the process of the, of the screening process, taking, explaining to them what each step is what's going to happen as well as then approving and onboarding, you know, once a graduate has gone through the process, if they are successful, then carry on with the process to employ the graduate and bring them into the company and breeze them with any of those logistics that comes with signing an employee contract from there the graduate or the employee is passed over to me as the hiring manager from there, then induction processes, like then taking the employee through the first three months of learning.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: So, in myself, along with my, senior developers, we have a, basically just a quick meeting in terms of what kind of tests will be suited for, depending on the role that the graduate is being hired for. Whether that's, not if that's for a sql developer role, if that's where php dev role or for mobile dev role, we'll apply that test according to that specific role in consultation with each expert essentially.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: I think what I've seen in the industry is that there's always been this level of certain test and what they give you according to your level. I think that works quite well and it's something we do as well. We would always make sure that we tailor questions or tests or the kind of questions we gonna ask to a graduate based on the level of experience. If it's a graduate, let's ask graduate questions: what is an array, how do you do an if statement, can you name conditional statements, what is a construct, all of those sorts of questions that will help, that you should know at the graduate level. We then tailor if you mid-level or senior we' then tailor the tests according to that particular level.

INTERVIEWER: So, it's not based on their actual qualification, as in this graduate comes from a college, this one comes from CPUT, that one comes from university of Stellenbosch, it's not on that level?

RESPONDENT: Oh, so yeah. As long as the candidate, obviously, has some sort of background of learning with what they're doing, that shows us to us as a business, that I have a solid foundation. It doesn't necessarily mean that if it's a university qualification or whether they went through an online academy, qualification, so we do take it into account, but it's not the end. It's not the very final decision that determines what kind of test we give accordingly. It's largely based on that individual's knowledge that they've applied within having that qualification that we look out for.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: Definitely having, a set of KPIs, apart from the induction and training point of view, cause obviously a graduate needs to understand how working for a tech company works how the industry is, and that's when they largely gain the experience in terms of understanding how business works but also seeing our writing code at the corporate level works as well. As they go through that period of learning and induction and training, post evaluation is the see how they've done with the tasks given at hand, how they've coped, with every day being a graduate that's not easily employed. So, definitely, a set map of KPIs, to be able to make sure and be transparent with the graduate in terms of what they've been constantly assessed on, as they do their job.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Yeah, so definitely when, if a graduate comes into place, our experience has always been to make sure that we give the graduates, the tools and the training that they need to succeed in their job. Because we've all been at a place where we found our specialisations in terms of where we going in the industry. I don't, I think it's a blanket approach that you don't know what you've done know. And, whatever you find passion as you go through the industry, as you work on different tasks, start finding a streamline of where you would like to specialise in. I think with that process in that training and development from working with developers, if that's other juniors or mid-levels or seniors, that also working with the manager with the dev manager that also contributes to the whole training ecosystem, but definitely there are, there are processes in place to make sure that upon from the graduate training, they're also given training and development on top of what that required for the specific role within the company.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: I think, the internship, process has been quite critical because I know from us as a company that's implemented that, having an internship has given, the graduate as well as the company that's hiring them to see what that relationship looks like, what the potential is for that graduate and what that means for working with the company. If we talk about post-employment, I think if you hired the candidate, fresh out of, out of being qualified and you put them in the process of being trained and given them the development that they needed in order to succeed, and they still don't match up to the quality. I think it's pretty clear that the candidate needs to know that they haven't succeeded. If there's an opportunity to improve, then they should be given that opportunity. After all of those, flags given to them and communicated to them and they still deem not a quality candidate in at least from a business perspective and from a team perspective, the candidate knows that, okay, they did not match up to scratch because they didn't follow through on the initial communication, which was, you're not doing great. These are the things you need to do in order to improve. That's based on the result of whether that candidate needs to end their journey with the company.

PARTICIPANT 15

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: I think that's probably an issue that goes back to when I studied in the nineties and still persists today. Graduates tend to know like the basic technical skills. So can they do development. They understand the programming language or two, they understand the database, how it works or that sort of thing. What they don't understand is how does your skills work in the real world? So if you get a job and what you doing: how does it tie into being part of a team, how does it tie into being beneficial to the business or to the client or to whoever it is who is going to use the system. If you don't understand that you can never going to be able to implement your skills properly in my opinion. As an example, you can make the best tech in the world, but if you don't understand, like the latest or shiniest, if you don't understand how this tech has a beneficial, real world or business impact, then it's pointless. You know, it's like a little shiny toy, if there's no benefit. That's what all work is at the end of the day, it's a benefit to somebody, but somebody supposed to make someone's life, either easier, more profitable, more visible, more something or other, they go to their benefit out of it.

Like a lot of people, especially in the tech industry, they come with this idea of, oh, I can make brilliant thing or this brilliant platform. They want to make the newest and shiniest all the time. Knowing how to, or when to have the balance between tech and how does tech fit into business and into the bottom line, basically. So like I always say sometimes actually just better to go low-tech and be beneficial to the business and the client and your team, as something that will take you 10 minutes or 10 days to implement low-tech would come as a new, it takes you six months to implement and you getting the same end result for 50 times the budget. So giving students that real world understanding of, okay, this is how I could fix it. Like, when you came out of college or when you go to business school, they teach you how to write a business plan, how to do this and how to do that but nobody teaches you about taxes and this is why taxes are so important.

This is like what you need to do when you first get a job when coming to the first job. And they have absolutely no idea. They just know they can do something. What they've been trained in. They dont understand how they fit in, they don't understand even dynamics, they don't have the soft skills. You can always learn a skill, like whether it's development, whether it's accounting, whether it's actuary science, HR, whatever, you can learn that because that's just a skillset, you're going okay. Here's what I need to do. That changes from business to business, from industry to industry. The industry, I might be a computer programmer. Two years later, I don't want to do this. I don't like this. I want to become a travel agent. The bottom line is you don't know how business works and you're going to need, I think who would people get into understanding what it's about.

If you do have some module around, this is how business works and that's that you can attach that to whatever course they're studying, but this is why it's important. I've always had a bit of a gripe with that before I worked at Company 7, I had my own business for 13 years. I had to learn everything from the ground up. Unless you study a business course, you don't get that. You end up sitting days at SARS, no resolutions. You know you get accountants, one accountant says this, another says that. You get a lawyer or, but you in that stranglehold of what other people are telling you, but you've never actually never learnt it yourself. I'd say that's a massive skill that's lacking. How does what I do impact on the business and how do I make it beneficial to business because there are so many great tech guys who come in, they brilliant but they don't survive at business side, especially in tech because you know the tech guys are all about the tech, but it's not about the tech, it's about the business because once you understand the business you can do whatever job you want, you can be a tech guy, you can be HR, you can be management.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: For me, the quality graduate is someone who has the base technical skills. As an example, you get all these frameworks, view, agile and react but they all variance of a base skill which is JavaScript as an example, and the same you get with different languages, with different databases like Oracle DB, Microsoft, SQL, MySQL all those things but they all based off the base skill of relational DB. And it's all about, do you understand the basis? Or what do you understand the core skills? Can you then convert it into business world?

INTERVIEWER: I'm just cognizant of time. I only have until quarter to seven. But, so you mentioned that the first thing would be someone coming in there who can apply theoretical knowledge as the first thing. Right? And the next thing?

RESPONDENT: The second one is someone that can fit into the team dynamic. You understand culture, can you communicate properly? Can you follow instruction and what works hand in hand with follow instruction is can you think for yourself, can you take the initiative? Do you know when to follow instruction and when to take initiative, getting that balance right. So there's that soft skills as well for this. Do you have the base technical understanding and know how? And then do you have the soft skills that would integrate with the greater action basically?

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: Okay. So characteristics. Well, the first thing I look for is someone who's humble. You must know. They must be honest about what you do know, what you don't know. If you don't know something, it's more beneficial if you say I don't know. If you don't know that we can always make a plan for you to learn it. So being humble is very important to me in terms of your skills and just who you are. You must give off a characteristic of assuming honest, you can never guarantee if someone is honest until you've experienced being around him for a while. That's it, you always look at, do you believe this person is going to be a hard worker and then also you look at, what's their forward thinking in terms of

where do they want to go harder or how do they want to progress, how do they want get better. That's why where you see yourself in five years, a lot of insight into how the candidate thinks and how they plan going forward.

INTERVIEWER: Yeah. Okay. So your characteristics is forward thinking, taking initiative, you said humbling themselves. They come in and being honest about their skill.

RESPONDENT: I just think they key to who you are as a person in character. That is why you trust people and why you work with people, why you do anything? Everybody wants somebody that can do the job, but that is hard working and honest and reliable. You don't want diva's, you don't want cocky, arrogant people. You can be humble, but you can be confident in what you doing. Everyone thinks that because you humble you are just like aaah, no you can be humble. I'm a person and I know I'm good at this and people will know I'm good at that, but it's not an arrogance. Just all those things that you need to do to be part of the greater whole. They must be individuals, we all fitting into a gog, into a contraption that's just milling out whatever. Even the guy that's sitting in his garage at home and doing whatever he's doing, he's got to go market his business, his got to interact. He always has to have those skills; people have to feel comfortable with you to be confident. That's why I think it's really important to have those skills.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Yeah. Critical skills will depend on the role. So we do more of the front-end stuff. Like I said before, critical skills will be like, you'll know your base, your HTML inside out, know your styling languages. Know your CSS3 inside out. Know how the web works inside out, how you set up a site. Know about actual optimization and things like that.

INTERVIEWER: So base skill is what you need to have for a more frontend position. What else would be like a critical skill? Baseline then maybe more things like is there anything interpersonally that they must have? Must they work in teams or can they work individually? That kind of thing.

RESPONDENT: I think it needs to be a mix when it comes to work. You need to be able to work in a team but then you also need to be able to go off and complete a task by yourself. You can't be stuck in one dimension; you must be malleable. That's very key skill and another key skill is that you need to be able to handle stress. If you can't handle stress, then you're not in the right industry and you're not in the right company. You should know that IT and stress-free doesn't work. The skill isn't to have stress; the skill is to handle the stress and to make sure that you staying healthy with that stress and how to manage it properly.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: So first phase is you do base screening, you checking people's CVs, people's profiles online doing all that hard work. So finding people on LinkedIn, on Facebook, looking at what are they like? Do you think they will be a good fit? Do they have the skills? Do they look like they are doing anything? We had this issue where this guy was posting weird stuff on Facebook, do you want a guy like that to come in. So he might not be, he might be brilliant technically, but is what you're doing with your personal life going to be an advantage to the business, to the team or whatever. You try to weed out what you can from there. Once you've got the CVS and you're happy with the skillset or what you think they're saying their skill set is; their skillset doesn't always have to match what you set out in your specification. Sometimes we just want to get people to apply. Then we invite you for an interview, but lockdown, it's obviously been a bit of a difficulty, but preferably would be to come into the office. Just have an initial chat, go through your CV, go through where you think you are going to be, if you're happy with that, we'll give you a test.

Depending on what your job is, would just be like convert this design into a front, web front end or go and create a CRUD system which you put on GitHub or Bit bucket so we can pull it and deploy it and test it out. Send us your code so we can see what's going on. If we happy, we know you technical, does it work. If we happy with that, we go into the next phase which is call you back in, speak about the test, where's your mind, salary, all of the types of things and that one we usually have HR involved. Out of the four possibilities that have got to the phrase, who do we think is the best option. If required to do more digging, we can call you back in or call on the phone, just to clarify things and then from there make the decision along with HR. Obviously it will also come in what do you expect as remuneration in terms of skill level.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

RESPONDENT: Obviously the first one you're looking at is in skillset and understanding of the work. It should be the most pertinent one. If don't understand that there's no point. From there we're looking at what is your expected remuneration, what is your expected return from the company outside of actual monetary value, and then you basically going into soft skills, but do you think that person will fit in with the team? Do you think that person will be easy to manage? Does it look like this person has the drive or whatever? Also does it look like the person is going to stay around 2, 3, 4, 5, 6 years or are they just coming in here for six months and then they want to go again? You need to write a plan as far forward and if a guy is only staying 6 months, what are you going to get out of it. It's going to take him three months to get used to what we doing and then, three months working, and then you need to find a replacement again. So those will be the key things: skills, what is the remuneration like? Looking at, can you long term plan around them and then like the soft skills.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Yeah, I think it's more just to do what, like, you need to find the right fit, and the only way to do that is by screening. You can compare it to buying a car. You can see all these cars online or in the newspaper and whatever, but until you go to the dealership, when you take the car for a test drive and you do whatever, 10 different cars and you narrow it down to which car is the right car for you, and to make a decision, you are not going to know, and that's the same principle, it would apply to hiring somebody. You got to look at what the options are, test the options, see if what was promised what you getting or likely to be what you're getting, which suites you best and obviously you make a decision from there. You're never going to get it right all the time, but I mean, you trying to mitigate risk is basically what you doing with screening.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: Also, obviously it's not an exact science, so you basically going on instinct, gut instinct and obviously prone to misjudge people and situations. It will be better if you have a list, like a one to 10, and you tick and whoever gets the most out of the 10, they the one. But we dealing with people and soft things, or intangibles it's made difficult to be like, you could read someone completely wrong and you've got a problem down the line. It's a negative, but it's also, something that you can get better at with experience, the more you start interacting with people. The more you do this, you tend to get a bit better down the line.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: Yes, a few times, not just at Company 7.

INTERVIEWER: Are you saying yes to the unsuitable or suitable?

RESPONDENT: Unsuitable. More often than not you get the right person but there've been times I've been like, I made a mistake or we made a mistake. This person is not so keen 3 months later, for example: we had two interns going back two years ago. Initially we thought the one would fit in, and they started together, they studied together, came from the same institute, same class, everything. Everyone thought that the one guy was a bit older, level headed. He looked like he could do it. The other guy was very playful, very distracted, very all over the show. But the second guy is the guy that still works with us. You know what I'm saying? It's like, once you've had that time, with the person can you really judge. The guy that we thought, everybody thought was going to be the one, it was actually, did we make the right decision. The other is excelling, getting applauded from senior management. The other guy is not pulling his weight, not improving so we had to be like, sorry it's not working out. So we had to say, sorry we can't keep you on because it's not working. After countless times of having interventions, time to figure out what's going on, no improvement and then performance management. That's why I'm saying its imperfect and you kind of have to go with it, take the knocks where you can and the wins also.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: So the actual job description would fall to me now. So basically we will give the description and that will go to HR and the business directors and they would say, ok cool, let's start the process and then you would sort of start vetting and validating and start looking for candidates within your parameters. Obviously in terms of expected salary ranges, that would also need to have a discussion with HR because obviously they have their limits on specific roles and what it is that we can remunerate.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: Basically be myself along with some of the insights from the project managers and the rest of the dev team, but obviously we'll need to focus into where the role is and where you have gaps. It's more of a custom list like, you obviously do the research and stuff, but its more like, for that specific role and it will be more custom so it will be like, for this role it will be XY and Z. It is not like a template to go, oh, we need a lead developer or X, or we need an intermediate developer of Y. It's more like: What's coming, what's coming down the pipeline. What do we need to do? What skill. Then it's like, cool, this is the gaps we have, this is the role, let's look for somebody who can fill that.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: Yeah that will be me, nobody else.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: Okay. Yeah, they would obviously supply certain character details that they would also need in terms of types of people, job history, salary expectations, all those things. They would come in also to do the sense check on, you know, interview the person, asking some questions about those things in the follow-up to kind of establish if they are technically good enough. HR will have to get involved and be like, okay, cool, can we handle this, can we do that, like HR type of questions. They got their own set of criteria that they need for that type of thing.

INTERVIEWER: So HR comes in to make sure that they are a more culture for the organisation as well. You look for culture for the team, right?

RESPONDENT: Ja.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: It would be me now at the moment, but also sometimes I will assign it to somebody that might know better than you about the subject. So if someone is doing the front end test, then the front end dev, there is no point in me looking at it and saying oh it looks pretty, I don't really know anything about frontend really. If it was Brent, I'd give it to Brent and ask him to check this out, check the code

INTERVIEWER: So, its role dependent so if it's all the backend stuff it would be you, all the front end stuff would be a senior frontend person like Brent was.

RESPONDENT: Ja.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: Not by institution, it will be more per role. So it will be like, you coming for a role, here's your test.

INTERVIEWER: So not qualification either. So you have a Cape Tech person versus a college versus a university. They all get a blanket test?

RESPONDENT: Yeah. Even if they get it wrong or not, that's not what's important. You're looking at the building blocks. You're looking at the source. You'd expect a more senior guy or one with a higher qualification maybe to be able to solve it in a better way, so go into the nitty gritty. Unless it's a guy who is high level, who studied before and he's worked before and is just getting the qualification, so let's make it a bit more complicated. So you don't want to make it too hectic that will take too long because we in the hiring process with deadlines. So we try to keep it as simple as possible with the simplest answer with the highest quality and then we take it from there.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: Now, when you evaluate, so that could be, look at KPI's and work coming out. As I said previously, are their skills improving, technical skills and soft skills. Are they meeting deadlines? Are they studying in their spare time, are they using their time management properly? So there is a lot of stuff, factors that you need to make sure you're keeping an eye on all the time, takes a lot of time as you need to spend time with them. But otherwise they might feel inundated or they might feel neglected or whatever. So, its constant monitoring, is there improvement. You have to look at the improvement

and the rate of improvement more than the output at the end of the day because this is a graduate you are dealing with. This is not a senior professional or someone that's been programming for 5, 6, 7 years.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Not at the moment, we are looking at setting up some. We basically do give them courses that they can follow, that they need to do and stuff like that. We need to relook at the way it's done, previously it was like, you do your own thing, there you go. If they're going to study something that would benefit the business, then the business can also look at covering costs or percentages or whatever. There is no formal structure with any of the departments in the business but I would give them different courses to follow so ja there is nothing but that is a business wide decision.

INTERVIEWER: What are the indicators in place to measure their success?

RESPONDENT: The biggest indicator is: are they completing what they are doing? Are you meeting your deliverables, yes or no. Why you not meeting your deliverables, now you go into the nitty gritty. Is it because we not giving them the correct tools or we not doing this and not doing that. Are they not doing this and not doing that, then we start investigating, monitoring, assisting and making your decision from there. In this industry, bottom line is: are you delivering, why you not delivering, let's see what we can do to make a deliver if that doesn't work. Okay. Now we're got to go to more stringent actions.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: We obviously, if they still with us we go through the performance management, until the point where, we would sever ties. If required, we will still give you a reference if you wanted but it will be an honest assessment. This person was good at this this and this and bad at that that and that. I wouldn't say, oh, you were good at this and you weren't good at it. Generally, graduates are still young so you don't want to be too harsh but you have to be firm and they got to realise that what they did wasn't good enough and I tell people that even if we have to let you go because you are not performing. At the time it might just be circumstances that caused them not to perform. You don't know what's happening in people's personal lives. You don't know what's going on wherever and that could be affecting as well. So there is a performance process but also a personal process you have to follow.

INTERVIEWER: A quick question actually. Do you think that there's maybe a lack of communication between the educational department or institution and the industry? Do you think there's that of a lack of discussion of what the industry needs versus what is being taught at Technikon or Varsity? Do you think there's a gap there?

RESPONDENT: I don't think it's communication personally? I think it's more, like, I've been involved with programs at businesses with technikons, colleges, seta's and all these government institutions. I think it's more like, there are some gaps in the actual training process. Like I said earlier, there is

technical training that they need to do that is industry specific, but there's other stuff as well. When I studied in like the nineties, like communication and stuff like that, that you had to do. You wouldn't graduate without it. When I speak to people they say we don't do that anymore. How can you not have communication anymore? That's not an industry specific skill but it's an important business and life skills. So it's almost as though they strip those things out and just gone with here's your technical skill. So the other way which is correct in my opinion is adding to that like life skills should still be part of it. You have life skills, like in school.

INTERVIEWER: Absolutely. So, so you saying that you don't think it's a lack of communication between the two, but now how do you think that communication fell by the wayside in the degree and how do you, like there must be something lacking between the two to make them not be level. Do you think it's just maybe of them getting their curriculum wrong or?

RESPONDENT: I think it's more like planning people, planning power, they have their own agendas and decisions and I don't know how the process works. I don't want to say things I don't know anything about. They should be more cognizant about it. I also don't know if its teachers or educators setting up the curriculum or business people that understand the industry that is part of that process. You have to have a balance so even if the communication is there, the planning process is not all there. You can have all the communication in the world, they are going to sign off what needs to be done at the end of the day. I really don't know where or don't have enough insight or knowledge to say it's this that or the other.

PARTICIPANT 16

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: I, for myself, it could be, adaptability that's one should skill person needs to have, because about close to 80% or 70% of what you do at school you don't do at university, it's more like, just like a foundation and everything else you just have to learn on the go, you have to learn on the job. Adaptability, communication is vital in all those, so that you be able to, communicate with, with your superiors in case maybe you do not know something, or you do not know where to find the thing, instead of struggling with yourself, where you communicated where, if you're able to do a task in yes, you stated, and if you're still unable to, you still communicate that I'm not aware of this, but then I'm going to do my best. I think adaptability and communication, those are the two major skills I think it's like, yeah.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: Quality graduate, a quality graduate is a person who is assertive yet also humble, respectful yet also respectful and also have also self-respect I feel, I think those are major things because a lot of things, there's no blueprint for the perfect thing, perfect candidate, but what I think stands out the most in order for you to be the perfect candidate is to be able to respect that other person, to be able to be assertive and most of all, to have self-respect for yourself and then everything else starts to build from there.

INTERVIEWER: And, and skill-wise, what do you think will be good, soft and hard?

RESPONDENT: Oh, soft and hard? one major thing is computer literacy. I think that's like kind of fundamental, especially since we school independent pandemics showed us that computer literacy is kind of a thing that we need. Communication is very vital, critical or strategic thinking. I think this goes in any area or any industry critical and strategic thinking. For my case we could, we could also say, that this is, I don't know if it's a skill, but the desire to learn like keen desire to learn. I don't know if that's a skill or not, but I think if a person has keen desire to learn, there are other words, the unstoppable they're unable to be stopped by anything. Last but not least open-mindedness yeah, I think I mentioned a lot of soft skills.

INTERVIEWER: It's good. I think, I think then that if you are saying there's lacking, you're not the only one, so don't worry. Now, then that brings me to what are the critical skills needed by graduates who will apply for a software development position? What are the critical skills that you think they need?

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Okay. I'll, I'll try to change the bid was, I'm not so into the software side. I'm more into the web development side, so I'm not too well-informed in terms of the software development. It's similar, for us what's critical is okay. One major thing is adaptability. Another thing is perseverance. Basic understanding of, oh, Microsoft, it's, it's a need. Microsoft skills it's a need Excel, PowerPoint and Word. Those are the major ones. Another one could be analysis, analytical type of skill. I don't want to say HTML. It's mostly to us. But I think also face.

INTERVIEWER: But that's fine, it can be to your role that you have applied for. What are those critical skills needed? Just remember, you said it's stuff for development and you are doing HTML.

RESPONDENT: Web development.

INTERVIEWER: Web Development is software development it's just, I'm just using a different term. If you need to have HTML knowledge or you need to have development knowledge like in .NET or whatever, then you can say that.

RESPONDENT: So, the three fundamental skills are HTML, CSS and JavaScript. They are the thing that runs throughout in a lot of, web developments. Those are kind of crucial. Another skill could be, to be able to, content management systems to be able to work with content management systems. I think that's, if you are adaptable person, you will be able to, even though you've never had it able to flow into it, another critical skill that I can think of. Yeah. Yeah. I mentioned communication, adaptability. I think, yeah, I think those are the ones. I think those are like the crucial ones. Like, yeah. I think those are the important ones, like communicating, adaptability, Microsoft like Microsoft, and also, Google sheets, Google docs. I'll put that under Microsoft, Google sheets, Google docs need to be able to manoeuvre around. It was at times where you'd be able to use with other things.

And what else? Yeah. I think those are the critical from my point that I need, if you get that, I'm telling you no matter you get a job with don't know the languages you'll kill it.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Okay. The first one was they would actually want to see your CV was their CV. Actually, they would first want to see your portfolio through a portfolio to be able to get your CV since our portfolio is like a website. You may able to get the CV and see the CV and then the check if you're a match. For me, I was surprised when they said I got the match, I was like "Oh really!" and from there, then it was an interview, and then from the interview it was more of trying to understand what type of person you are. I think that's the major things on a lot of interviews, because I think the CV is like, okay, what skills do you possess? Do you at least possess the minimum skills that I think you will better to be able to do the job? Okay. Now, interview, who are you? What type of person are you? We like to understand you better.

We want to see you speaking. Cos paper is something else. Then when we speak. After speaking, getting to understand them, getting to understand me, me getting to understand the company like me and the person interviewing me, we clicked, that was incredible, we clicked and we do, he's a backend developer and I'm more of like the front end, but then we clicked because of the type of person you are by then seeing it, if you a great fit and then from there, I got it. That's for this job. There was another job where the process is different where you actually need to, there's a test. There is a test like, to like a challenge that you build, maybe whatever that you asked to build and then after building it, then after building it, then you're called in for an interview. It's more for there for that companies. Like they don't want to see your CV, but it's more like, show us what you got then after understanding, oh, this is what you got, let us get to know you better as a person.

Do you fit into the company or, will you be able to gel in with the company as a person, I think I believe interviews are for that. I thought I picked up from my interview.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: The advantages on using the screening tests. It's actually to see if a person is, one is to see if the person really wants the job, if he is going to do what it takes, two, it would be to say the advantages would be also to like, to gain knowledge on the type of people like to filter out the type of people, to filter out a certain group of people that you want a certain mindset that you want to, they have a certain mindset that you want because you're like, okay, this screening will be based on this and that meaning that the people who actually pass the screening have a certain mindset that's common amongst them. I think it's, yeah, it's very important because it also helps on choosing the right people for the company because once you're able to screen to filter out a certain group, based on a certain mindset, maybe that criteria is based on how the company wants. They want people think like this, then this screen could be based on that, knowing that fully well, that the people who pass the screening, that the interview process is going to be a much faster that sometimes you, maybe you might not even need the interview process because they already have a certain mindset that you are as a company wants.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: The disadvantages would be, you might actually miss out on finding a person who could add a certain diversity in your company where maybe you said you want a critical thinker, by the way, where else you could have found a creative person, where this person could have some diversity in the way that we approach problems as a company. I think it's more of like an example, a clear example would be if I go to the store and the person asked me, like, when I go to a store, then like the sales person, how can I help you? And then they won't give me the opportunity to find something different that I might not, that I'm not aware that I actually needed. I think it's more of like, yeah, you might, yeah. You

lose opportunity to get something new and fresh. That could beneficial for the company. Maybe even the company itself is not aware of what it needs, I think that's like the major one.

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: I actually don't know from my side. Oh, I, in my company, they, we arrived. They introduced us to the team. Yeah, to be honest, I don't know how to answer that question, but I can ask it according to my opinion on how I saw it in my side.

INTERVIEWER: Yes, so remember you now started at Company 7 and then they had to evaluate and see "Is P16 good for this job?". What do they have in place?

RESPONDENT: Oh, so for in our case would be a nice case where they, at first, they had, we had nothing to do the whole day, so they had to see what we could do. Then, so see, what are you going to do with your free time? And then went just asking around on what can we do? Like keep on peeking out. They gave us a task to do, very tedious task on a language that we never did. They said, slice this up and then give feedback after, and then once you slice it up, package it and then send it. Then, so it was more of like, okay, are you able to think on your feet, are you able to acknowledge, if you do not know something and able to was there were times where we didn't know something, then we can start to them was, we resell to them like, hey, I need assistance or what do you need this. If you are a resource, you are resourceful person. Google and YouTube became my two best friends. Actually, that all happened in the first week. Were given another task of, okay, before you even start building, you have to start first by understanding the website where we had to QA the whole site, we had to first check if everything was working out. And, like the first one was like a car company, which was, it was a long process. We have to check every single car; all the images are there. Yeah, I did check if you're analytical also you're able to notice things. So, yeah. I think through that they saw, this guy's legit.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: No, unfortunately we didn't have it yet. It was actually up in the air. It was, we had a discussion about it, where it would be done. And they did it for one. It was more of like, okay, the R and D stuff. Right. Research and development that side we didn't do, but also what they said is that was the notice. We had two interns, right? So, P17 is more like a front-end developer and I'm more lean to the, no no P17 is leaning to the backend and I'm more leaning to the front end. They said, okay, we're going to give you tasks based on your inclinations. Meaning that now I've got more tasks. That's a front end. Like I remember in December I was given like, it was hard, given a task where I had to create scripts for a WordPress print structure where, like I never did it and then it pushed me and it challenged me.

It made me, you know, better. It was now I'll put, honestly say I'm a WordPress developer in a sense. I'm able to build it. Same with now with the current with the current project that we busy with, they give you a task where it pushes you as a person and as a developer to move out of your comfort zone and start solving the problem. Because like now we busy with Firebase and I never did Firebase. Because of like, of course the trust me was like, fill the page structures based on this to create a connector to the database. I don't know how, but I'm going to do it, and today I'm kidding. I'm enjoying, I think I love the thrill of a challenge. Yeah.

INTERVIEWER: Yes, of course. There's no real formal measurements in place. They just gave you work and you either did it or didn't do it. Now what happens if you didn't do it. If you couldn't do it or you never got a task that you couldn't do?

RESPONDENT: There were, but so instead of them taking it over, they would actually explain, give me a hint. And, because I remember there was a time with, I was busy with another project where I, I didn't know. I honestly didn't know. I honestly didn't know, but I reached out and he explained and Brent explained on, okay, what other, what other approach I could take. And then that was like, oh, cool. By him giving me. It was more of like; I went this way and it was a dead end. Like, no, actually there's another way. He didn't like, oh, because you can't do it, we're going to take this task away from you. Like, okay. Yes, you can't do it because you're looking at this this way, look at this on about a different way. That's where, like I learned like, oh, that's how you do it. Yeah, the one project where I honestly didn't know, oh yes, there was actually M and Jill project.

Right. That project was, so I was given a project and they like, okay, I'll be able to do it. And then I reached a blocker where I couldn't, like, there was no other way instead of rebuilding it, so then another developer took it, in a sense. Yeah, it was like a mailer, a very complex mailer, but also not to boast, that mailer couldn't solve itself.

PARTICIPANT 17

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: I think it's, knowledge about, service, different services that are out there, that hosting services and dev ops skills. We know how to build things, but we don't really know how to host them and which, can't think of the word. It's more knowledge around dev ops and, yeah.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: Quality graduate? Someone who knows how to think, like who doesn't necessarily know how to do things, but like how to think about them.

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Patience, perseverance and critical thinking. I think that's it. I can't think of anything else.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Okay. So, there was not tests. They were just interviews and were selected for interviews based on our online developer portfolios. The personal website, that's got your projects and your skills listed. Yeah.

INTERVIEWER: So, so you applied for the position and you sent them a link to your online portfolio and then they called you and then you had to first interview?

RESPONDENT: Ja.

INTERVIEWER: Ok, and then?

RESPONDENT: There were two interviews. I don't know if it's because they usually have two interviews because I know initially after the first interview, they said, there was some delay, they said they weren't going to select an intern in that moment. A couple of months later there was another interview, which they then like selected me as an intern. I don't know if that's the process to have two interviews or if it was one interview and another interview and I don't never making sense. Yeah.

INTERVIEWER: Yeah. And were they, online or in person?

RESPONDENT: The first one was in-person. That's because it was before the pandemic. The second one was online and then also because of the pandemic.

INTERVIEWER: After the interview, why then notified by email or via telephone?

RESPONDENT: We had, the place where I studied, there was a guy that, he spoke on our behalf and so he called me. I don't know how he was notified, if it was by email, so I don't know.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: What kind of screening tests are we using? Like are we talking about like, coding tests, so coding.

INTERVIEWER: This or actually any in any screening, so this could be, many companies now do interview, then they do test, then they do, what's the word, when they look at your tests with you, like a feedback, a feedback interview, then they do a culture interview, then they do, this like a whole string of things. What do you think are the advantages of that.

RESPONDENT: Advantage is you get to like root out the people who are not suitable for the position, not to say that the person you're going to select is the best candidate, but I don't know. You, you, yeah.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: I suppose you might overlook someone who might actually be a perfect, a better fit for position, but maybe just doesn't do well on the screening tests for some or other reason. I think that's the disadvantage.

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: There was no official, test or measurement. I suppose they would be evaluating just by whether or not you're able to complete the tasks that you were assigned to.

INTERVIEWER: What happens when you cant complete the task, what then happens?

RESPONDENT: Well, as an intern is a lot of leniency, so long as you're communicating and you flag something early, then, there's a lot of understanding.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: I suppose it would again be whether or not you can complete the task.

INTERVIEWER: Are there any training or development programs set up?

RESPONDENT: There weren't any solid structures. You fall in whenever you, wherever you can and you learn whatever's needed, at the time for the particular project, but there's no outlined, learning paths for you designed to upscale you.

PARTICIPANT 18

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: The skills are lacking is literally their experience and their ability to articulate their way through a problem. A lot of them, they go into university and they think they've learned a lot, but then when they come into the first job, they find out that they actually don't know a lot. It's a big step down for them to actually realise that there's still a lot for them to learn going forward. Yeah. It's just a gap in the knowledge between what they've learned and what is expected in when they first start their job.

INTERVIEWER: Would you say that; do you think that the curriculum is a bit out-dated when they enter the workplace?

RESPONDENT: Quite outdated, it's just, when they go to university or something, they get taught a wide range of skillsets, but very shallow knowledge, each skillset. When they come into the job that they have to narrow the knowledge base to a specific set of languages, say for instance, they learn maybe PHP and .Net in their studies: When they come into the job, they may want to only use PHB or.net, and then they need to start specialising in that to actually meet the criteria of the work. A lot of the people that are coming very well-skilled some don't, that's kind of why we do a practical test at the end.

INTERVIEWER: And what other skills do you feel is lacking like, so that was technical, are there any interpersonal skills lacking when they entered the workplace?

RESPONDENT: As long as they got a willingness to learn and a positive attitude, ambitious, that steps up more because yeah, when people start anything new, they are very apprehensive. They're very shy and not sure what they're getting into. As long as they've got the ability to actually solve problems and innovate, they can grow in their position.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: Yeah. Again, it's their attitudes, their willingness to learn, for me, if they can answer a few basic questions that they should have known from university on how systems work and how to, and then they do well in their final code, that's the main crux to get through it. A lot of the graduates that get that come for interviews, they get screened by HR. They've got their own process of screening. We go through, we do all the technical stuff, so it will be more down to technical knowledge and their willingness to actually solve the test problem on their own time. We can also tell if it was done by them or someone else, just by the coding styles.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: Yeah. Professionalism, ambitious, positive attitude, willingness to learn. The ability to solve problems, knowing the why, as well as the what, honesty, integrity.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Definitely problem-solving and being able to innovate a solution around the problem. Also on top of that, they need to know how the respective languages well enough to actually do the job.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Okay. The HR does a lot of the initial interviews and collections of CVs, whether it be through independent research or the, what the recruiters, once they done their screening, they'll pass the CVs through to us. We all go through and review those. We'll cherry pick the ones that we think will be a good fit, depending on what the requirements are for the job, the language that they need to know. Then we'll end up doing interviews with them. It used to be in person. Now it's all on teams because of the whole COVID thing. Once we are happy with the interview, that's gone through, I can share a couple of questions a bit later, then we'll end up costing them to come back for a second interview after the coding test. And we will review the coding test. We will let them know if they've fallen on like the shortlist. The coding test, we basically looking for, was their work submitted on time, early, late, what's the quality of the code and how they came around to solve the problem.

Yeah. Once they're on the short list, then we will decide out of those who actually comes in for the job.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

RESPONDENT: The main successful indicator will be their problem solving around their implementation of the test. That will be the final indicator, success indicator.

INTERVIEWER: What about will the others in the process? So that'll be the final one. What will be, how would they pass the first one or the second?

RESPONDENT: The first one will be ambitious, positive attitude for the initial interview and also their ability to answer some technical questions. Then it's the coding test, which is their problem solving. After that, it's just down to deciding out of the top picks of the, that test to see who gets the job. I mean, the last time we did this, we actually ended up hiring two people because we couldn't differentiate too much between them. And we gave them both the chance.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Are the initial HR screening tests or very important, because otherwise we get bogged down by a lot of CVS, which we don't always have the time to go through. That's also things, have changed basically with CVS in the past. People used to put together a big CV with lots of references, lots of pages. I don't have time for that anymore. Having someone to actually break that down into a couple of pages so that we can go through like say 10 CVS in an hour, get a, and then make our choices from there, because time is very important. We don't have a lot of time between the meetings and getting our objectives out.

INTERVIEWER: Okay. So, so the advantage would be that HR, they screen the CV's and they actually only send you what you require?

RESPONDENT: Yeah. They know that we need like a SQL developer with .Net skills. They will know that they won't send us any PHP developers or that we need someone in an Azure space, not in a AWS space. They can, they can pick and choose from the CVs, what is best suited for the position. We will refine that going forward.

INTERVIEWER: Okay. Are there other advantages do you think further on in the process?

RESPONDENT: Yeah. So, well, each stage has a screening process. You have your HR, which screens out what's best fit for the role. The interview will screen out what the knowledge factors around those roles. Then the coding tests we'll screen out those that can, or can't problem solve. That, so each thing is its own screening stage.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: On the, sometimes on the HR side, they're too generic and that could miss out some talents. If let's say that the person didn't put their CV together properly, not everyone knows everything and not everyone has the skillset to put together a good CV upfront that could be also a disadvantage that they don't actually teach in university as well. It's how to actually put together a good, compelling CV. Also, not everyone knows everything. That's why the test in the end is a good thing, allows them to do their own research and to problem solve in their own time to come back with a solution as more about the solution on how they approach it, that we choose the candidates.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: I don't think we've ever deployed an unsuitable one, but we have had tests that were completely done incorrectly and we have rejected them from that or tests that were either handed in late or, and there was like shoddy coding and so on. That's it does give a good indicator on the what's it, the skill level.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: Of all dependent on the work that's going to be done. If we get a tender that comes through and that we need a developer for a specific field set, and we can't cover that in-house then we will put out the I'll say requirements, and then the HR will post that out.

INTERVIEWER: So who puts that job description together?

RESPONDENT: It will usually be either the team leads or our managers. That will be dependent on if we got like a tender or we've got to send a resource out to a client and what is required. We will get those details from either the clients or the tender.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: I believe it will be the people doing the interview, so it will be the team leads and the managers.

INTERVIEWER: And where do they source the characteristics from? Is it part of your vision?

RESPONDENT: Would say, maybe I'd say personal experience in the roles and what would best fit in the team. You can kind of see if someone's going to be like a team player or not by the attitude and so on.

INTERVIEWER: Then, so then one big characteristic on your part. Now that you mention team could be that they need to be good team players, right?

RESPONDENT: Ja definitely. Not all work is done by a single person. Usually work is done by team or you get placed at a client and you've got to be able to fit into their team and work there. So that also is a good factor.

INTERVIEWER: Do you think that graduates struggle to work on a team because at varsity they are often doing projects on their own? There's no moving pieces from, in the agile world or in any IT world, you have the design doing a bit of work and then you have the developer is doing a bit of work and then the QA does work and then maybe it comes back to the developer

RESPONDENT: I don't know how the university works now, but when I was in university, it was like 20 years ago. We did do team projects. I do expect them to kind of do some times, but we also only like one major one, but graduates are very malleable. They tend to want to learn and fit in. Cause it's the first job and so on it is that they tend to fit in a lot better than someone that's stuck in their ways. If you

can bend them to a field more easier. They do fit in quite well because they also want to prove themselves so that they do fit in. They, they tend to fit in. Well.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: I'm not sure about HR but otherwise it will be the team leads. We put together all the questions and all the tests that we would like them to do.

INTERVIEWER: You put together the questions for the technical interview guide. You also put together the actual tests, the coding test you are going to give them?

RESPONDENT: Yeah, we put together all the tests and we also review the failing test in the end.

INTERVIEWER: And tell me how long is the one coding test? How long do you get them to actually do one?

RESPONDENT: We do the coding test. We usually give him a week or just under a week. If we speak to them on say a Monday, we'll give them until the Friday to hand it in it's not a small test, but it's not big. It's like a medium thing. It will take them a few nights of work depending on their skill level. Obviously if they're handed in earlier and its good quality, it also boosts up their rankings.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: We, we probably talked about this already to whittled down the amounts of CV. We don't have a lot of time working on,

INTERVIEWER: So, so that's right at the beginning of the process right? And then you have the technical interview, you had the test, and then at some point then you make the decision to employ the graduate. Is the HR involved at that point as well?

RESPONDENT: Yeah. Once we come up with a final decision, we will pass back to the HR. This is our choice. They will go back and they will start doing the whole contract write up and all that with the employee. Well, soon to be employee if they take it. Yeah. After that, we just hand the process back to them and they continue with it.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: We are currently; we only have one standardised questionnaire. We will ask them random questions out of it. We have one standard test, coding test. We, we can tell the difference between a junior coder and a, a senior one, depending on their coding styles and how they implement the solution.

INTERVIEWER: So, so those that are done is you, as a team lead would decide.

RESPONDENT: Yeah. I actually created the test, the coding test. I came up with the concept and the requirements of it and the questionnaire we, the team leads came up together with over time. We, we just keep adding to the questionnaire and removing from it, depending on how we feel.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: Okay. I know we kind of answered this, but these are the same, this use for every software development vendor, or that is customized by certain qualifications and education institution.

Currently, we only employing .net developers. The tests are specific around there. If we had to employ like a PHP developer, we will have to change the test to, for that role. But we are employing for .net roles at the moment.

INTERVIEWER: And, every graduate gets the same test, irrespective if the one came from Cape Tech etc.?

RESPONDENT: Yeah. It doesn't even have to be a graduate, can be any employee, anyone coming for the employment or not. Okay.

INTERVIEWER: And you don't customize it based on whether one came from UCT or one came from Cape Tech?

RESPONDENT: No, it doesn't mean a difference to us. If you can do the work, you can do the work.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: Yeah. This is, we've got an internal KPI process. So once a year we do KPIs. We go through the performance of the person we go through. We've got a training mandate so that everyone has to at least upskill themselves each year. That's all comes down to the KPIs. That's, that's our performance index internally.

INTERVIEWER: So tell me on their KPIs. The, do your graduates do like a three-month probation or something like that?

RESPONDENT: Yeah. That every employee has a probation period.

INTERVIEWER: What are you doing that? What, what kind of measurement do you have over there?

RESPONDENT: As long as they meet their sprints, they complete their sprints, they complete their work, we all happy. If we find that they're having trouble actually articulating the problems and solving them, then we will most probably have to go back and actually have a meeting with them. It was probably with some senior management as well. Maybe that they're not fit for that specific role. Maybe you can push them somewhere else. Maybe their ideals have changed. If not, they may leave the company at all. Depends on what happens in the interview. I haven't actually had to do one of those. I'm not entirely sure of the whole process of that. Currently, everyone that I've had an interview with has excelled in a job.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Yeah, so we work on a two-week sprint. Each team gets a set number of tasks per sprint, and then the tasks allocated to each person and they need to be able to, and every morning we will have a, a stand-up where we very few say what we're working on today. What we worked on last time, what problems we came up with, we can offer solutions to those problems. In the end, it's up to the developer to actually compete their work over that task. Obviously, if they do it faster or slower as long as it's completed within the timeframe.

INTERVIEWER: Okay. Then, is there any training or development programs set up for the graduate?

RESPONDENT: Yeah, we do have sites like Plural sight and all that we have subscriptions to, that they are able to go through and upskill themselves. We do have a budget each year for just upskilling yourself, for instance last year, I went through an Azure course, everyone can say, okay, I want to go, I want to learn this or that. They can upskill themselves as long as it's within the alignment of the company and what we actually working with.

INTERVIEWER: Okay. When you say you did an Azure course, did you do it on plural sight?

RESPONDENT: No, it was through Microsoft.

INTERVIEWER: So your development programs can be individual and can be, doesn't need to be in-house.

RESPONDENT: Yeah. Sorry. Another thing is like, the one graduate we employed, [name deleted], he's already been with us for about six months or so. He's already started a SQL course for himself, which he needs to complete by the end of the year. As long as I showed initiative and they can apply for courses, it will be assessed and either approved or we can suggest something else that may push them in a better direction. And so on.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: Yeah, I guess that would be, my manager will need to sit down and talk to them and discuss the way forward. I'm not, my side is like interviewing and putting forward for shortlist, employments. I don't do disciplinary.

INTERVIEWER: Okay, great. I'm gonna stop the recording now. P18, don't go anywhere.

RESPONDENT: Okay. Sure. If you want, I see I can't share my screen. I was going to actually share a couple of questions. If you want to, that you have a look and read through that.

PARTICIPANT 19

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: Sure. We find probably the biggest skill that is lacking is mainly interpersonal skills and very much the skill of curiosity and problem solving. Those are kind of the aspects that we found are probably the most lacking in terms of skillsets.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: Quality graduate is someone who has completed their qualification. It doesn't matter if it's taken longer, but the fact that they have completed it is absolutely critical. Again, they don't have to be an A student. It's really about people who are willing to learn and grow because graduates come out and the skills were through no fault of the university come out with skills that are rather outdated from an IT point of view. So the industry moves very fast. The most important thing for us is looking for people that have got a great attitude and that are willing to learn and have an open mind and are curious. Those are kind of the traits that we're looking for. If they've got a little bit of work experience that helps. When I say work experience, it doesn't have to be and it probably won't be in IT, but even if they have waited or they have worked as a cashier, any of those sorts of skills that they're learning, just interacting with other individuals is something that we definitely look for.

IQ 1.1.3: What characteristics do you look for when employing a graduate and why?

RESPONDENT: We look for, one for graduates that are energetic and we try and look for ones that have done a bit more and not just past their degree. We're looking for people that have quite a passion for things. We look up, we ask them, or we look for characteristics of, have they, how they implemented some of the stuff, how do they, what apps do they have on the phone, on their phones? What maybe books do they read? Again, it's all about making sure that they're are curious enough because a lot of the work that we do, we doing for clients and we doing for customers, so a graduate need to be curious in understanding the context of whatever solution and business problem they're trying to solve. So that's how we kind of pick. That's how we look for we're looking for not just that you've pushed your degree, but even that you may be involved in some community work.

Maybe you've helped with some, I dunno, maybe in a church context you've helped at a sound desk or whatever. It might be anything related to kind of going above and beyond because that is actually what's required in the job on a day-to-day basis. It's definitely not jobs that are kind of nine to five. It will always be times when you have to put in extra work, et cetera. So, so you do need to be, you need to be change fit, so you need to have the ability to understand that things don't stay the same all the time. Very much in terms of curiosity again.

IQ 1.1.4: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: They need to have a basic understanding. Again, we not that concerned whether they're have done, whether they have completed a degree or diploma, or whether they've done a BSC or a BCOM, we really looking for them to have a) completed and have covered a variety of in, from the development space. It will be a variety of application development programs. We don't expect them to have the international certifications that are required. We need them because the international certifications that you do often post university or the ones that allow us to get, to do implementations of various products, so it might be various Microsoft products that you have to be certified in to being able to do, and our clients won't do business with us if we're not certified. So, so the graduates need a fairly broad understanding and have at least passed their subjects so that when they start with us, we can then start putting them on various tracks so that they can get those international certifications and then start to specialise as they go.

Again, it's just about completion and as wide variety as possible. They might've done of in the development space. They might've touched on things like ERP systems, SAP, Oracle, they might've done a bit of cloud work. We really looking just really for their foundational work. What we will say is that these year long programs or these short-term certificate programs are just not sufficient. There's a variety of reasons for that. Some of it is just, they don't go into enough detail. Secondly, we need a student who's grown and matured and has got the tenacity to complete something that covers around about three years.

INTERVIEWER: Okay. Are there any other skills that you think they need, like maybe the ability to problem solve or teamwork or those kind of skills?

Yeah, definitely communication skills are important. That goes along with, that has a knock on impact on teamwork and again, kind of curiosity and problem solving because nothing's going to work as the manual tells you it will, and you're going to have to adapt and change all the time.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: We do have some assessments that we have got access to, but generally speaking for graduates, we will, depending on the role, we will do some really basic assessments and those were customized on the role. It could be, if it's very much a java kind of role, we could run a little test on Java, but most of the assessments that we do will be customized assessments that our technical people will put together. It might differ depending on the role that we're going to employ them into. There are, I mean, there are some various, I'm trying to think of the tests that we've used recently, for most of our graduates, we will do. We won't do like psychometric assessments on. Most of them, we'll go with panel interviews and we'll ask them situation based questions. We don't really do assessments unless it's a

specific requirement for a specific role, but we are generally, we look at what they've covered in their qualification.

And then, it's more about the interpersonal skills and the willingness and the attitude that we are looking for. We will do that from a panel interview then than from a formal assessment test.

So, when the graduates apply, the first thing you do is you do a panel interview with them?

So we'll screen them. The talent team, we've got a youth program team, and they will screen the CVS or the candidates that come in, the graduates that come in, they might have a telephonic call with the graduate before we invite them into an interview, but they were pretty much jumped straight into an interview and a panel interview.

INTERVIEWER: From there, they might or might not write the test and when you are happy with them you make the offer?

RESPONDENT: When we're happy with them, we make the offer and they'll be very basic questions. We'll normally have someone that's relatively technical in the interview and it's more gauging their interest of what they should have covered. So it will be very basic. I dunno, like basic coding principles of basic program principles. We very rarely give them actual tests to write? If it's someone that we are interviewing for a more senior role, like a level two role, or a level three role or something like that, then we will we'll, we actually have, again, customized because they've changed so quickly, but we've got technical tests that we will administer. Some of them we do it live and then they complete it online in front of us by teams or whatever, but for the graduates, it doesn't really serve much purpose for us. It hasn't added much value to us. It's mainly, we do validate their qualification.

We go through kind of normal checks from that point of view, criminal checks and qualification checks. But, but beyond that, we don't do technical assessments with our juniors. We might ask them more technical interest questions, but we don't give them a technical test. We don't think it's the most accurate way of hiring graduates.

IQ 1.2.2: What are the success indicators that approve a graduate for employment?

RESPONDENT: For hire, it will generally be, we looking for potential. We're not looking for people that can add value from day one. We're looking for people that are willing to learn. Often we asking questions about, I don't know, what do you do as a hobby? Often you'll find that a lot of their hobbies involve, I don't know, writing an app for their grandfather's shop. You'll often pick up stuff like that, and then they need to be engaged. They need to have a natural interest in what they doing. It's not easy. The other criteria that is quite important for us is communication skills. It's not, we do spend an enormous time on interpersonal skills. We know people are quite tense in an interview setting. We've spent quite a bit of time just trying to get to know the person and get them to relax, but then, they need to, they need to be ambitious.

They need to want the role. We're not just going to give them because they rock up for the interview. We're looking for people that are ambitious.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: I think there are definitely advantages of using screening tests, depending on the role. So, you've, you are, if you are employer and all you focus on from a software language, point of view is Java or SharePoint or something very specific then absolutely you can use those tests as a baseline screening, but they can be quite expensive and they can be quite time-consuming. In our environment, the reason that doesn't work for us is because we expose our graduates to multiple programming languages. We wouldn't know which one to test them on, and that why technical assessments don't really work for us. Often we are using languages and technical things that are still being developed. So they're not even mainstream. To test them on it, doesn't really, isn't really going to help. Realistically, in this country, there are people that have got great potential. Maybe they just haven't been given the advantages that some people have and maybe they just don't, they're not necessarily just book-smart.

Cause you can, unfortunately with the technical assessments specifically, you can trick them. A lot of the work in place, the working or the personality type tests, or when you're looking for it in a workplace, they don't often have a reference point. So, so the accuracy of those for us from a graduate is just, it's often not as valid.

INTERVIEWER: So would you say there are no advantages for using screening tests on graduates?

RESPONDENT: Yeah. There are advantages, just not for us.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: See advantages for disadvantages of the screening tests.

IQ 1.3.3: Have the results of the testing ever been incorrect, thereby resulting in the employment of an unsuitable graduate or in not employing a possibly suitable candidate?

RESPONDENT: I mean, they are, I'm thinking back quite far. I mean, I've been with dimension data for more than 15 years and we have, we currently are not using assessments, but we have used them before. And, and sometimes it depends on the graduate program you are putting together, but sometimes it has worked and sometimes it hasn't and sometimes you get really smart graduates that exceed your expectations on the assessment, but they're just not an organisational fit, and they just don't fit into the culture of your organisation or they don't fit within the team that they're going to be part of. More often than not those for us, it's those skills that will often determine whether a graduate is going to be successful. Yes, they need to have some baseline skill, but generally speaking, it's more the

interpersonal skills that we can teach them. We can teach them anything technical, but it's very difficult to change attitudes.

We can give, we've got some very smart people here, but they can be very difficult to work with as well. They're not very good from a team dynamic point of view. I've had both, I've had people that we've mm'd and ah'd because we don't think they're strong enough technically. If we had assessed them, they would have assessed pretty poorly. I've got people that are, that have gone off to do amazing things all over the globe. At the time, we've mm'd and ah'd whether to hire them and likewise, we've got people that were incredible from an assessment point of view. Then, week one, week two, week three, they've dropped off or they very impatient and they're not prepared to learn. They just jump at the next opportunity.

RQ2: How are tests articulated to successfully employ a quality graduate?

RSQ 2.1: How do companies determine the characteristics and skills required for the position the graduate is applying for?

IQ 2.1.1: Who creates the job description of the positions within your company?

RESPONDENT: We've got a global team and we are, we use a job, something called Radford, which is an international job grading system. All of our jobs descriptions are written and standardised on a global level. We've got a job framework it's called the NTT job framework. That will determine what the requirements are for every single role, from a graduate to a receptionist, to a director in our company, across the globe. And those are fairly standardised and baselined. What does change in them or what we are able to add to them. And that we will work with the line managers where the line manager will be able to guide us specifically, okay, for this role, what are the exact technologies? Cause we can't build out job descriptions per technologies, the technologies change all the time. The names or the certifications or types of the certifications, and some of those requirements will change from country to country.

And, and also depending on the exact certifications required or technical ability for required technical product, they're going to be working with. We've got a team that does it. And it's refined all the time. It's an it's quite a live document.

IQ 2.1.2: Who determines the characteristics required for a software developer and where are these characteristics sourced from?

RESPONDENT: Most of our characteristics that we look for, they come straight out of our values from an organisational values. We've got mission statements, a vision and values and they can come directly out of there. I will say that dimension data has a set of values and NTT has a set of values and there has been a period of uncertainty. So, so there's two differences of values, but the dimension data employees, we will probably align to the global NTT values. If I send you the Company 8 values, you'll

get a very clear idea as to the link between the characteristics that I've spoken about. I've got the descriptions of those as well.

And our recognition. Our recognition programs, when we have performance discussions with individuals, they're very much, a lot of them are all value driven. So, so you will see a very common theme throughout that. That's where you'll start to see how important that culture and everything is within the organisation.

INTERVIEWER: You speak about culture, is that also assessed within your panel interview? Is someone seated in that interview to make sure that the candidate would be able to fit in culturally?

RESPONDENT: Very much. It's probably almost the number one priority. Even our interview guides have got this, we've got various forms of them, but even our interview guides have questions. I'll send you a copy of that as well. It's a fairly old one and we've changed the format. It's all electronic now, but I've got it in a nice word document and you will even see how we can literally tick off some of those, the values that are important for that particular role, and then ask people questions according to what we, how we want to try and elicit that information from them in the interview.

RSQ 2.2: How do companies determine which tests are suited for the position the graduate is applying for?

IQ 2.2.1: Who is involved in setting up the screening tests?

RESPONDENT: We have got, so we've got a recruitment team on middle east and Africa, which is the business I sit in, we've got a team that heads up recruitment and they will be the execution and the recommendations per role, but on a global basis, we have got a framework of assessments. We use a company called TTS and every job, I mean, theoretically we do, we could like, we don't often do it for every job in the organisation, there's a certain battery of assessments that get executed by this company called TTS who we have outsourced it too.

INTERVIEWER: Sorry P19 TTS stands for,

RESPONDENT: I don't, I don't even know I will get it for you. Cause I only know them as TTS, TSF. And, and so on a global level, we've got some link to our job grades and the complexities per role and whatever. We've got a bit of a battery, but then when it comes to technical assessments, those, the actual managers together with the technical people per department or per team or per job role requirement, they will, then they will customize the question, a technical assessment.

IQ 2.2.2: What is the role of HR in the screening process?

RESPONDENT: We, from an HR point of view, I mean the talent team, the talent acquisition team is a centre of excellence within the HR organisation. The role of the HR team is really to make sure things are fair, the correct processes followed. We attend at least one of the interviews. We don't often do more than one or two interviews, maybe two interviews, depending on the level of person, but for graduates

its normally one interview and we all attend the interview and we'll make sure that the interviews are conducted in a fair and realistic manner. Yeah, we might probe and ask some additional questions as well in those interviews, but ultimately, and we'll have a conversation in terms of culture fit and guide the business. But ultimately the business makes the decision.

IQ 2.2.3: Who decides which tests are to be done by the graduate?

RESPONDENT: So, so we've got people who run our youth programs, so they will generally decide. And its generally based on our global best practice. It will always be in consultation with line managers and HR and ourselves. It's quite, we've got quite a matrix structure as an organisation. There's a lot of people that gives input before decisions are made.

IQ 2.2.4: Is the same tests used for every software development graduate or are the tests customised based on qualifications and education institution?

RESPONDENT: The, the tests that we, the tests we will use we'll do, will depend not on the qualification, but on the requirement at that customer. And for that role.

RSQ 2.3: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.3.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: After the graduate is employed? So, so there's ongoing learning. We'll put them through quite a lot of interpersonal and soft skills training. We'll also put them through some technical learning and obviously they need to a) need to attend it, need to be engaged in it. They need to complete certain baseline items. The criteria for success really is their level of being able to be independent and us to be able to send them into a client, obviously an appropriate level, but at the end of the program, so that ultimately they can start generating revenue because we sell and then we sell work to clients and then they need to be a part of the delivery team or the project team that's delivering.

INTERVIEWER: So how do you know that they are able? Are there feedback sessions? Are there goals set for them?

RESPONDENT: Yeah. Lots of goal settings and KPIs in terms of what they need to complete by when, but there's a lot of on the job training and a lot of coaching and mentorship that happens. There'll be a lot of, give them a small piece of work and assess them, how they've done, give them feedback, talk to them about how they could have done better, et cetera. So, yeah, it's a lot of feedback and exposure and just exposing them to other people in the organisations.

IQ 2.3.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Yes. There is always a fairly structured program. Whenever we look at a graduate program, we will look at well, what's the outcome that we require from this specific program. We'll work into a curriculum that will cover those various items. It's quite programmatically done and it's normally, it will generally always be a 12-month program. Normally the first three months is quite intense from a content point of view. From three months after then they start working in the business and we're giving them real life thing and real life experience. We just with them and we are coaching them as we go.

IQ 2.3.3: What process, if any, is followed post-employment if the graduate is not deemed a quality graduate?

RESPONDENT: Look, I mean, if they not, I mean, we normally, we always put them on our graduate program is, I mean, the contractor for 12 months at the end of those 12 months, our plan is to absorb as many. We don't take on, we try and not take on too many graduates because we want to be able to absorb as many as possible. So we rather do quality over quantity. And, and there are times, I mean, there are times that we get to the end of the program and they haven't, they haven't got to the level that we would expect or the level that we require. We might have to just not give them a permanent position or not renew their contract. So it does happen.

INTERVIEWER: So, after the 12 months, you either renew or not. That's how you kind of filter through who you are keeping.

RESPONDENT: I think there's quite a lot of pressure. If they are not succeeding and I'm not happy, they might drop off on the program and go and decide to do something different and then leave the organisation.

PARTICIPANT 20

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: Actually the first thing I'm thinking that the leadership and the ownership of the work and the communication and the teamwork, especially because, and also they, they need to know how to manage the career when it comes to work, the boss and the people around them, actually, because it's everything like the new for them, the work culture, everything. It's a bit lacking.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: The quality graduate. They must adapt to the multitasking first and they must find time for them to relax first. When it, when they are on work pressure or something, they find they how to find some time to relax. The next thing is smart way of working and a keen eye for the mistakes. The main thing is patient for the discovery. Also they must be, I mean, like the continuous learning, like they must be keep on updating them when it comes to the learning. The developing is like, every time it's a new technical, I mean, technologies are coming up, so they have to keep them updated. That's it.

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: The critical thing is like first the app to do the mathematical aptitude thing and the problem solving skill. They must know, I mean, the programming language in the sense, like, if, what developer you are, what developer you want to be, you have to be, you have to know the required languages for the programming thing and the excellent organisation and the time management skill and the accuracy and detail for even for small thing, like, and teamwork, that's everything actually. Yeah. And understanding of the latest technologies developments.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Actually the, when I was graduated and came into developing thing, like first they filter my CV and they call me and ask for a technical interview for, sorry, first they given me the online test, like an aptitude and the programming both included in that. Then if I clear that, then they asked me to come for a face-to-face interview. They did ask me for like all the projects I did for when I was an undergraduate and the post-graduate. And I did a masters, everything. They asked me for that. Once they happy with that test, then they asked me to do a small project. They give me a project and I did

some project and I send to them. Then they call me. After that, they actually, they finalize like a salary thing and the availability, everything.

INTERVIEWER: What did you use for your test? What program?

RESPONDENT: Csharp, like a language or?

INTERVIEWER: No, the software. Did you use Microsoft.net or did you just write code in word.

RESPONDENT: I'm not sure because it was like seven years before. I'm not sure they give an online test, but I'm not sure.

INTERVIEWER: Yeah. I understand. The individual, were they face to face or via zoom or meet.

RESPONDENT: Via meet. Actually when I was in India, like when I was a final year masters, actually they do a campus interview, right. Like six months, last six months, few companies will come to the college and they will do interviews. Actually, most of the people actually, they will ask particularly for the students about 60% and they mustn't have any backlogs in their semesters. If they satisfy that criteria, then they will do like, they will, then they will go for the next step of that interview. It was like, yeah, it's a campus and a face-to-face interview, not then the first thing is online. Yeah. The second thing is that face-to-face interview the technical.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: Actually, the other one is like, we can, came to know the confident level actually, when they do direct interviews, I mean the direct screenings, and we also know the communication skills.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: The disadvantage, actually the screening test may be difficult for some people because they feel uncomfortable and anxious. She is actually, which may lead to poor performance in the interview. Also there may be disappointed when they face these questions.

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: You mean like after the screening?

INTERVIEWER: No after you start working.

RESPONDENT: Actually the thing is like we have like a three-month probation period when they, I mean, when we received the offer letter, they said like, it's a three-month probation, so they will keep an eye on us when like a new, when we are like new graduates, actually, when we, how we are coping with the team and solving the problem, if it is any issues, like on the leadership quality, everything, they will keep an eye, but I don't think they will do any interviews again or a thing like,

INTERVIEWER: So, so they'll keep our eye on you but do they have meetings, to that meetings, like regular meetings, or how do they keep an eye on you?

RESPONDENT: Not regular meeting? I think I, from my experience, I, I have, it's like only one time. They, they should do meetings for me to know like how coping that new work actually.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Nothing like that, because they don't accept like, very, like, very good coding or anything. Like if you, if we have a good team, like they will help people each other. So, yeah.

INTERVIEWER: Okay. So their evaluation is not very formal. It's just on the job. They have a look at what you doing on the job. Were there any training or development programs for you?

RESPONDENT: Training?

INTERVIEWER: Or development programs like, so say you are now a .Net developer but now you want to go and do some Kubernetes, do they pay for you to do training?

RESPONDENT: If you wish to do any trainings, we have a site, like we can log up call and they will provide us a training as well, if it is on request, actually.

INTERVIEWER: Okay. And is that online training or is there any other training by your senior developers or managers? So they all train you as well?

RESPONDENT: Actually they are giving us a training, like as a developer, we need to know like, do a testing as well. Like actually recently we received some unit tests as well from our team lead and the senior developers, they teach us, they give us a training, how to.

INTERVIEWER: Okay, perfect. And that's it P20. I'm going to stop the recording quickly.

PARTICIPANT 21

RQ1: What criteria are used for identifying graduates for placements in IT companies?

RSQ 1.1: What are the characteristics and skills a company uses to define a quality graduate?

IQ 1.1.1: What skills are lacking when graduates enter the workplace?

RESPONDENT: I haven't, I don't have much experience interviewing or being too much around graduates. So, but the first thing that's quite obvious is the collaborative work. Because most of the times some graduates, they come in without any collaborative with meaning: Sometimes they can't take criticism. It's something that we learn, all of us, to take criticism. So, and usually when people are writing code it's, they put so much time in there. Imagine if someone tells you no, you've been doing it the wrong way, some user did take it the wrong way. And yeah. It, the skill itself to welcome criticism. Actually well, that's the best one of all of them, because most of them, okay, let me just stop there before I answer and not ask questions.

INTERVIEWER: Ok so remember I'm asking you what you think graduates are lacking, so you say they lack the ability to be criticized and they lack

RESPONDENT: Yes.

INTERVIEWER: Ok and what else do you think they lack when they enter the workplace?

RESPONDENT: So, yeah, so I don't think this one might fall under lack, this thing called imposter syndrome when you starting work. It kind of, everyone kind of feels like maybe I don't belong here, maybe I'm not good enough. You're starting that one, if they are lucky enough, they don't feel that way but most of us went through that where you feel like you don't belong there and it affects your experience with your co-workers, because you feel like you're being judged all the time. So that's one thing. Sometimes there are what we call agile methodologies, the way we conduct our development differently. It's a new thing. For some graduates that never did any practical work by themselves. There are these agile methodologies that we follow through in our software development journey. Getting used to that idea of how things are, about managing stuff, cause it's not really about just code on that point, how to manage that code and all of those things. Yeah. That's some of the things that lack, but not always.

IQ 1.1.2: What in your opinion is a quality graduate?

RESPONDENT: That will be someone who at this point when they are a graduate, they already know their theory. So when they know their theory, the idea now is to make sure that they apply what they know. The big thing is to apply your theory. So many people, everyone who's a graduate: The assumption is they passed some theoretical test and they know some theory. The question is, can you apply that theory that you know, because there won't be any question that asks you, what is this? What is that? The idea is this is what it is. How do we make this thing out of this? If they can apply that, that

would be perfect, that's an ideal, thing is, that is another phase that you use to select people to say, okay, let me, can you apply what you know? Number two, that person need to be relatable. You know? Software engineering, most of the time is stressful.

As much as it's stressful, you need to still maintain your relationships with your colleagues and everyone else around. So if you can actually, you can relate with them under pressure and they are still good. So that's the best. I dunno how you will have to rephrase that somehow. The point is applying knowledge and they can handle pressure perfectly well.

INTERVIEWER: No, but that's good. What you are saying is that a quality graduate is someone who can apply their knowledge that they've learned. So that's very important. What else do you think would be a good graduate? So applying your knowledge is an important aspect, what about all the other soft skills?

RESPONDENT: So that's yeah, that's the other one. I mentioned that you need to relate to people. Okay. Let's say, let's say you're working with someone. Let's say you a graduate and they will want to communicate something to a senior. Maybe, maybe a senior: Sometimes the junior might see something wrong with someone's work who is a senior. How do you tell them that? So it's more of a communication. Yes. I think that's the communication thing that needs to come in on that one. And what else? I was writing a few stuff. What else? What else? Yeah, they just need to be relatable and does communicate with them. Yeah.

IQ 1.1.3: What are the critical skills needed by graduates who apply for a software development position?

RESPONDENT: Number one is just a person needs to be proactive, very proactive. With software development no one will be coming after you or monitoring you all the time. They need to have that capability of just working independently. To be given a task: They just follow through with the task and they don't, you don't need to monitor anyone because you already have some of your own problems. They need to just make sure that they act on their own. If they need help. To say when they need help is important. Because that imposter syndrome that I mentioned earlier, it causes people not to say when they're struggling with something and because they feel like so on that, yes. The critical skills part will be the pro-activeness. That part, where I was saying that really need to make sure that they can act on their own. They're not, don't always need to be told what to do.

They also need to focus because most this job needs you to focus. You can do multiple things in one go, you just need to focus one thing and just finish that one thing and then go to the next thing and so forth and so on. As much as that's simple to say about focus, because everyone know what focus is. Being actually focused is a thing, which I also kind of struggle with. Yeah, and communication, which are already mentioned, which that's important because sometimes at one point or another, if a developer would need to communicate with a client, someone who doesn't even understand your code or anything, they just need a product done. What you have written or not written. They don't really care about. They

want to click a button, things work, they want to make sure that all calculations come up, right? You just need to make sure that you can communicate someone that doesn't know what you're talking about.

That you can breach that it's rare that you have to communicate with the client. In case that happens, you need to be well versed on how to communicate with them. And the other thing is resilience. Yeah. Resilience. There are sometimes again, I'm going back to the imposter syndrome because if you let it get to you'll give up and just not do your work anymore. You just know to be resilient, always believing in yourself, making sure that you just get through everything that you need to do. And number one, number. The other important thing is to ask when you're stuck, it's important to ask because no one else, to ask when you're stuck, like when you're blocked, you don't know what to do. Ask your seniors, ask someone who knows, ask your colleagues, your, some of your graduates might, might also know what you're struggling with. You can easily communicate with those people and then they get you unstuck. Yeah.

RSQ 1.2: What company tests are done by graduates before entering employment?

IQ 1.2.1: Explain the screening process and tools used at each step.

RESPONDENT: Okay. So, so those ones they vary, they vary a lot. Cause sometimes you, okay, let's walk, we're talking about graduate level. Graduate level, first thing is qualification. You just need someone whereas a computer science or an IT degree or anything related. For me, I didn't have a computer science related, I just did physics. That way, so what you trying to look for is logical thinking in someone. They just need to know how to think and stuff like that. This is the part way at the CV part where someone, the CV is checked by the HR person or the recruiter, whoever it is. If they are happy, they set up an interview with the HR. The HR is happy and tick all the boxes. Now they involve the team manager, whoever that graduate is going to be under. That's when well before the interview process, there is, eh, what you call this a technical test, just to see if someone was how to code simple stuff, can't know everything.

Sometimes you can ask them to create a small application. The idea behind creating a small application is to make sure that someone, you see how they write their code, you see how they can write something that someone else can read. Someone else can understand, because the idea is someone needs to really understand what you're writing because you can write a lot of confusing stuff. Yeah. Someone needs to, that's what you've seen in the technical test. It doesn't really need to work per se, but we just need to see what level you are in your writing of code. After that, then that's when the technical or the team manager or whoever the graduate is going to fall under gets involved. Teams, usually these days is over zoom or teams and then discussion simple questions, normal HR questions. Sometimes there might be another technical test during that interview, which is rare, but it's possible sometimes to say, okay, let's just write some code and someone will be sharing their screen and then they be writing their code.

At that point, you just need to see how someone is acting under pressure, because I'm assuming at that point, there's a pressure because someone is watching you do your stuff and you just want to see how they behave under pressure. In that also, it's not really about their code. It's also about how they react to the code, to the pressure that you giving them. Cause pressure will be there and we need someone to hold pressure respectfully as much as you are under pressure, but be respectful to other people. But I guess that summarises the whole process.

INTERVIEWER: Yes, so you said screening and after screening, interview and then when that's done, you did the technical test. Once that is done you do a technical interview, then after that you are chosen for the job.

RESPONDENT: Yes, depends on how you do on the technical test.

RSQ 1.3: What are the advantages and disadvantages of using the organisations tests to determine the fit of the student to the company?

IQ 1.3.1: What are the advantages of using these screening tests?

RESPONDENT: The screening test, it kind of saves time. It saves, yeah, it says time. You don't want to waste anyone's time getting into an interview when you could have just screened someone and seen how they do and just let them go or get to know them better. It also shows you a few more skills that they have, and it gives you a highlight of what level they are in their career. Or some people can be graduates, but they are kind of experienced. Yeah.

IQ 1.3.2: What are the disadvantages of using these screening tests?

RESPONDENT: The disadvantages particularly for graduate level, right? Sometimes you might find someone who is potentially good. You understand someone who is really raw, who doesn't, wasn't as exposed to coding as much, but they have a lot of potential, but the screen test will definitely show them off. It would just push them off. You don't know whether someone is going to do better or not, but you lose a good number of graduates because they are not used to coding, but it's something that they can easily learn when they done. That's that disadvantage. Yeah.

RQ2: How are tests articulated to successfully employ a quality graduate?

SQ2.1: How is the success of the evaluation strategy measured post-employment of the graduate?

IQ 2.1.1: What is the process of evaluation after the graduate is employed?

RESPONDENT: Yes. That one is, I'm not really sure about, I don't want to, Im blind if I said I knew, but I would assume the team manager every now and then the team manager always tries to make sure that you're okay, checking how you're doing and checking whether, usually also the graduate needs to

be like, hey team manager how am I doing, because you need to also be that open each other. Am I doing well, where do I need to fix stuff? Where do I need to improve? Because if you don't communicate like that, someone would just say, you not a good fit, and now you have to be back to square one. You just need to, the graduate needs to be proactive. If it seems like there is no structure that the company isn't following to say, after this much, we need to check your role and your performance and all that. Yeah.

INTERVIEWER: Okay. So the process of evaluations will be one-on-ones so that the developer with a team manager and they'll have regular check-ins.

RESPONDENT: Yes.

IQ 2.1.2: Are there various indicators in place to measure success post-employment and a training/development program setup for the graduate?

RESPONDENT: Yeah. So, so the way usually the, what we follow, the agile methodologies that we follow, we kind of make sure that we reflect every day. We do what we call stand ups every day. So it is for everyone. Right? To say, what are you struggling with? What are you working on? Are you going to be done in time? So there's also like sprint planning. In sprint planning, we just allocate people tasks, right? Say, this task needs to be finished by approximately so much time. If you do manage to complete that task in that time, which means you are doing as expected. Yeah. If you're struggling, you say within time, before it is expected to be presented to anyone. So, so there's those measures that once you are in, it's difficult for you to fail. Basically, once you are in your job, when you sign something it's difficult for you to fail because everyone else is for you, there to help you.

INTERVIEWER: So then teamwork is very important.

RESPONDENT: Yes, teamwork is very important.

INTERVIEWER: So is there any development or training set up for the graduate.

RESPONDENT: So, so in our team, in our company, so there are different teams, so different teams do things differently. Now our teams are, we have Friday, every Friday we do training. We do, we make sure that we have sessions to talk about technology and educate each other on what we think, things that are new, what we are going to, what we are hoping to do with whatever technology that you presenting and letting others know about that technology and so forth. There are some courses that you can take them. Udemy courses, Plural site, all these online courses that are paid for by the company for you to learn more stuff. There's plenty of stuff you can do. Usually you have to just commit yourself and you have everything.

INTERVIEWER: And that's it. Is there anything else you'd want to add maybe?

RESPONDENT: Yup. So, so in all this, as much as you might have all these criteria, but your personality is not, you can't work with people as much as you're good and all that, but you can't work with anyone. It is important for graduates to really be able to work with people.

INTERVIEWER: Basically to fit in, for them to fit in and be a culture fit actually.

RESPONDENT: Exactly, a culture fit. So that part is usually covered by the HR and team manager. But then everyone pulls out their best self in an interview and then reality starts after four months or three months. You're like, oh, this person is difficult to work with.

INTERVIEWER: Is there anything else you'd like to say before I stop the recording?

RESPONDENT: No.

INTERVIEWER: Ok, I'm going to stop, don't go away.

APPENDIX E: EDITING CERTIFICATE

7 November 2022

SONJA LIETCH
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CERTIFICATE - EDITING OF MASTER'S THESIS

I, the undersigned, herewith confirm that the editing of the Master's thesis of Sonja Lietch, *"THE RELEVANCE OF COMPANY SPECIFIC TESTS FOR IT APPOINTMENTS IN CAPE TOWN, SOUTH AFRICA"*, has been conducted and concluded.

The finalised thesis was submitted to Sonja Lietch and cc'd to Dr de la Harpe on 7 November 2022.

Sincerely

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South African Translators' Institute (SATI)