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Abstract

Educational artificial intelligence (AI) is an emerging field of expertise that has the potential to transform the practices of both students and lecturers. Sophisticated technologies would be able to expand into higher educational institutions which would allow for the possibility of interactions with less effort required from lecturers at almost no cost. Thus, this study aimed to explore the perceptions of employees' that work at a private higher educational institution in terms of the affect artificial intelligence could have on job security. This study used a data collection technique that was qualitative in nature through the use of interviews that will allow for the gathering of in-depth information for the purpose of addressing the research problem. The data was interpreted through thematic and hermeneutic analysis. The study found that a large portion of the employees at a private higher educational institution would feel a sense of insecurity about their jobs as a result of the introduction of AI within higher education. The study however highlighted the fact that AI will be used in order to assist as well as enhance the teaching and learning experience rather than completely replacing the job of the teacher.

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1. Research Title

Employee perception of artificial intelligence towards job security in Private Higher Education institutions

2. Introduction and Contextualisation

Educational artificial intelligence (AI) is an emerging field of expertise that has the potential to transform the practices of both students and lecturers (Bates, Cobo, Mariño & Wheeler, 2020). Sophisticated technologies will be able to expand into higher educational institutions which will allow for the possibility of productive interactions with less effort required from lecturers at almost no cost (Bates et al., 2020). When speaking about AI or any technology, its application can be linked to different levels within higher education such as institutional applications and direct teaching and learning (Bates et al., 2020). Thus, it is very important to understand the potentially disruptive transformations not only from the perspective of AI, but also from a more inclusive understanding in relation to teaching and learning (Bates et al., 2020).

The purpose of this study is to investigate employees perceptions regarding AI towards job security in private higher educational institutions. The research study will discuss the relevance and research problem in detail. In addition, the studies research questions and objectives will be outlined. The research report identifies and discusses previous literature that is relevant to the topic and provides a theoretical framework that is appropriate for the study. The key terms of the study have been conceptualised. The research methodology and research design have been identified and discussed. The researcher has identified the research plan for the study and explains the most appropriate data collection technique and data analysis method for the study. The research report then takes into account the trustworthiness of the study. Following this, the researcher will give a detailed explanation of the findings. Finally, a conclusion will be provided by the researcher in terms of relating the findings to the research objectives, outlining ethical considerations and recommendations for further research, and through the identification of limitations within the study.

2.1 Rationale

A study of employee perception with regards to AI towards job security is of great value to the higher education industry. According to Popenici and Kerr (2017) the future of higher education has been characterised by a path of major changes due to the link between the development of new technologies and the increase in the application of AI. In addition, the 2018 Horizon report anticipates the growth of AI in education by 43% between the period of 2018 and 2022 (Zawacki-Richter, Marin, Bond & Gouverneur, 2019). Therefore, it can be identified that the implementation of AI technology is undoubtedly linked to the future of higher education (Zawacki-Richter et al., 2019).

More importantly, AI is currently progressing at an alarming rate, and despite the numerous opportunities brought about in teaching and learning through AI applications, new ethical implications and risks would also need to be taken into consideration with regards to the changes occurring in higher education (Zawacki-Richter et al., 2019). For example, in the presence of budget cuts, institutions have been tempted to replace teaching by means of profitable AI solutions (Zawacki-Richter et al., 2019). Therefore, teaching assistants, student counsellors, faculty members and administrative staff have been left in a position of uncertainty or fear due to the fact that expert systems, intelligent tutors, and chat bots could potentially take their jobs (Zawacki-Richter et al., 2019).

The study would contribute to the body of knowledge as it would explore the impact AI has towards the employee perception of job security by conducting semi-structured interviews with employees at higher educational institutions located in Gauteng. In addition, the stakeholders and managers of various higher educational institutions will benefit immensely from this research study due to the fact that they will get a better understanding of the ethical implications associated with the introduction of AI applications and the benefits brought about as a result of AI.

2.2 Research Problem

The new challenges in relation to the use of AI requires an extensive and severe change among the rigid norms of higher educational institutions (Ocaña-

Fernández, Valenzuela-Fernández & Garro-Aburto, 2019). The implementation of AI-based formats has created an environment that identifies the possibilities for substantial improvement with regards to all the different levels in higher education (Ocaña-Fernández et al., 2019). The same implementation has allowed for the accurate personalisation of student learning in accordance with their requirements for the purpose of integrating the different methods of human interaction with that of information and communication technologies (Ocaña-Fernández et al., 2019).

The aspects previously stated have resulted in new ground-breaking institutional challenges that have not been dealt with before and would require urgent action from higher educational institutions from a designing and planning development perspective. This would include the need for higher educational institutions to plan, design and implement measures that will promote skills within the digital field for the purpose of improving professionals capable of developing and understanding the technological environment (Ocaña-Fernández et al., 2019).

AI-based teaching and learning solutions could potentially change the education system entirely which some view as a sought-after solution to existing and future challenges, whereas others view them as a risk to job security (Renz & Hilbig, 2020). Popenici and Kerr (2017) have indicated that AI already has the potential to replace a large portion of teaching assistants and administrative staff within the higher education sector. Therefore, the researcher believes that there is a need to address the rising fear among the majority of employees within higher education that high-level machine intelligent (HLMI) systems will completely replace the job of the teacher (Popenici & Kerr, 2017).

2.3 Research Purpose

The purpose of this qualitative study is to explore employees' perceptions of AI towards job security in private higher educational institutions.

2.4 Research Question

What are the employee perceptions of artificial intelligence towards job security in private higher education institutions?

2.5 Research Objectives

1. To provide an overview of artificial intelligence in a global context.
2. To explore the employee perception of artificial intelligence.
3. To assess how employee perceptions of artificial intelligence influences job security in higher education.
4. To propose solutions on how higher education institutions can overcome the employee perception of artificial intelligence.

3. Literature Review – Theoretical Foundation

Theories provide a lens through which people can view and interpret the distant objects in the various fields of interest for the purpose of getting a better understanding of a phenomenon (Plooy-Cilliers, Davies & Bezuidenhout, 2014). Broadly speaking, a theory can be described as a logical explanation of constructs, concepts and relationships that are specific to a phenomenon or process within a particular discipline (Plooy-Cilliers et al., 2014). Theories form the theoretical foundation that would allow for the collection, analysis and understanding of data in order to transform information into knowledge (Plooy-Cilliers et al., 2014). Therefore, this study will utilise Herzberg's motivator-hygiene and equity theory as its theoretical foundation.

3.1 Herzberg Motivator-Hygiene Theory

The Herzberg motivator-hygiene theory was developed in 1959 by Herzberg, Mausner and Snyderman (Habib, Awan & Sahibzada, 2017). The theory provided a two-factor motivational model that is used in order to explain employee satisfaction within the workplace (Simon, Parker & Stockport, 2018). According to Herzberg, Mausner and Snyderman (1959), there were two main factors that influence the overall level of satisfaction or dissatisfaction of an employee. The first being motivators which result in employee satisfaction when adequately fulfilled and the second being hygiene factors that would need to be present in order to sustain members (Costello & Welch, 2014). Furthermore, Herzberg et al. (1959) state that hygiene factors are based on the condition of an employee's job context and would therefore influence the level of dissatisfaction experienced. If hygiene factors, such as salaries, interpersonal relationships, organisational

policies and working conditions are enhanced or maintained, then an employee would experience limited dissatisfaction (Simon et al., 2018).

On the other hand, motivator factors would influence the amount of satisfaction experienced based on the content of an employee's job (Simon et al., 2018). For instance, if an employee has a sense of responsibility, personal growth and an interesting job then he/she will experience increased satisfaction (Simon et al., 2018). It is important to emphasise that the improvement of motivator factors will increase satisfaction, but not directly impact on dissatisfaction (Herzberg et al., 1959). Nevertheless, it can be identified that the motivation-hygiene theory takes on the view that motivation and hygiene factors function independently (Katt & Cody, 2009). For example, according to Katt and Condly (2009), an employee that has a meaningful job which allows for personal growth (a motivator factor) may be hindered in terms of motivation due to the presence of inadequate working conditions (a hygiene factor). However, an employee that has excellent working conditions may lack motivation as a result of insufficient psychological growth factors such as the presence of meaningful work (Katt & Condly, 2009).

However, further research has identified that the theory would need to be tested empirically to allow for further advancement (Ozsoy, 2019). For instance, the theory would have to undergo testing across multiple fields such as cultures, occupational groups, personalities, and countries (Ozsoy, 2019). The concept of motivation is very complex and would require an in-depth examination in order to take into account the various factors that can be affected (Ozsoy, 2019). In terms of individual differences, it is important to identify that employees who continue to work in the same or similar working conditions vary significantly in terms of attitude (Ozsoy, 2019). More importantly, a number of studies have been conducted in order to criticise certain aspects of Herzberg's theory and it is argued that the motivation-hygiene theory may produce different outcomes depending on the situation (Ozsoy, 2019). Therefore, it is extremely difficult to generalise the theory of motivation.

The Herzberg's motivation-hygiene theory is relevant to the research study as it provides a model that can be used in order to explain employee satisfaction within

the workplace. The concept of the theory highlights that the motivation of employees can be influenced based on the changes occurring within the hygiene and motivator factors. The theory also discusses that each individual will examine hygiene factors from their own unique frame of reference. This will complement the aim of the research paper in terms of identifying the perception of each employee towards AI in private higher education institutions (PHEIs) and the affect it will have on job security.

3.2 Equity Theory

The equity theory was first articulated by the researcher John Stacey Adams in 1963 who was a behavioural psychologist that focused on research within the field of job motivation (Hoffman-Miller, 2019; Skiba & Rosenberg, 2011). The equity theory focuses on the principle that the distribution of rewards should be based on an individual's contribution (Hoffman-Miller, 2019). In organisations, equity would refer to the fair balance between the job input and what is received from the employer for the work completed (Colquitt, 2012). There are numerous comparisons in relation to equity within the workplace environment such as job equity, market equity, and company equity (Hoffman-Miller, 2019). Employees would therefore compare their input-to-outcome ratio to that of other employees and expect to see roughly the same (Cosier & Dalton, 1983; Lovegrove & Fairly, 2017).

When a discrepancy is detected, an employee will attempt to resolve the issue in one of three ways: (1) changing their inputs, (2) altering the perception of the inputs and outcomes, or (3) by leaving the organisation (Hopkins & Washington, 2006). Ultimately, a worker may be motivated either positively or negatively in terms of their perception towards fairness in comparison to that of others, with equity often described as an exchange relationship (Hoffman-Miller, 2019). The perception of inequity could potentially contribute to a state of dissonance that could affect the motivation and job satisfaction of a worker which could result in increased stress (Hoffman-Miller, 2019). If equity cannot be restored by way of reducing inputs or increasing outcomes, a worker may resort to leaving their job (Skiba & Rosenberg, 2011). It is important to take into consideration that extensive laboratory research has been conducted on the equity theory, however,

limitations have been identified within this methodological approach (Carrell & Dittrich, 1978). Future research is therefore required in order to apply the theoretical concept to that of practical application (Carrell & Dittrich, 1978). This has been accomplished within the twentieth century when the principles of the equity theory were effectively applied in a practical sense within the workforce of most developed countries (Skiba & Rosenberg, 2011).

The assumptions of this theory align with the study in question. This theory is relevant based on the assumption that not every person will perceive equity or inequity in the same way. Therefore, if an employee believes that AI application tools lead to unfair treatment, this could result in the employee leaving the organisation.

4. Previous Literature

4.1 Theme 1: Overview of artificial intelligence in a global context

The birth of AI goes back to the 1950s, however, one of the most influential definitions of AI was established in 1956 by John McCarthy who identified that AI would be able to progress on the assumption that almost every aspect of learning can in principle be so precisely described that a machine would have the ability to simulate it (Haugeland, 1985). Gordon (2011) states that AI can be defined as the development of several analytical tools that collectively attempt to exhibit intelligent behaviour. Therefore, further research on the rapid progression of AI has indicated that the technology does not prescribe to a single field, but instead is an umbrella term that is used in order to describe a range of technologies and methods, such as data mining, natural language processing, and machine learning (Zawacki-Richter et al., 2019).

AI and machine learning are often mentioned within the same field of study, as machine learning is a method of AI that can be used for supervised and unsupervised profiling (Zawacki-Richter et al., 2019). For example, by predicting the likelihood of a student dropping out of a course, or through the identification of topics in written assignments (Zawacki-Richter et al., 2019). According to Popenici and Kerr (2017), machine learning can be defined as a subfield of AI

that is able to use software in order to recognize patterns that can be applied to situations that were not covered within the original design. Nevertheless, the question still remains on whether machines will be able to develop further within PHEIs and the effect that will have on job security.

It can be identified that over the past decade the understanding of AI has become increasingly differentiated specifically with regards to the discipline of teaching and learning in higher education (Renz & Hilbig, 2020). The first research project in the field of AIED started in the early 1970s for the purpose of understanding the profound association between AI and education in terms of reasoning, knowledge presentation, and learning (Renz & Hilbig, 2020). Today, various committees, conferences, and political events are dedicated to the complex nature of AIED themes (Renz & Hilbig, 2020). According to Popenici and Kerr (2017), AIED can be defined as computing systems that have the ability to engage in human-like processes that would include the use of data to learn, adapt, and solve complex processing tasks. The aim of AIED is to enhance the traditional education and training system by developing an integrative, flexible, adaptive, and effective environment (Renz & Hilbig, 2020). Given this understanding of AI, it is therefore important to determine the potential areas in which the technology can be applied.

4.2 Theme 2: The link between artificial intelligence and job security

The topic of AI is a major subject that supersedes many current trends, but only a small percentage of the population actually understand it (Ocaña-Fernández et al., 2019). In this regard, Ocaña-Fernández et al. (2019) state that the large number of citizens that are categorised in the so-called “world village” is considered to be in an unprivileged position with regards to AI technologies and are particularly unaware of the possible effects. Therefore, employees at PHEIs may be unaware of the potential risks in which they are exposed to as a result of the inevitable advances that are emerging at an increasingly accelerated rate. The consequences of this dynamic process are based on the ability of technology to optimise many diverse activities: in a world that is reliant on real-time interactivity, the consequences of possible alterations as a result of the application of AI will give rise to new challenges (Ocaña-Fernández et al., 2019).

This indicates that previous advances within the 20th century are minimal in terms of the impact created compared to what is being developed as a result of AI, which poses enormous problems due to the speed and scope of those possible impacts (Ocaña-Fernández et al., 2019).

According to Zawacki-Richer et al. (2019) intelligent tutoring systems (ITS) is a software application tool that can be used in PHEIs which can present many challenges in relation to job security. ITS is based on automated tutors that can be used in order to teach mathematics, science, languages as well as many other disciplines (Ocaña-Fernández et al., 2019). Based on neural networks the application tool would be able to provide a learning path for an individual student, which content to select, and would be able to engage with the student in dialogue (Ocaña-Fernández et al., 2019). ITS has a great deal of potential, especially with regards to large-scale distance learning institutions that have the ability to operate modules with thousands of students where teaching on a one-on-one basis is impossible (Ocaña-Fernández et al., 2019). However, Popenici and Kerr (2017) have indicated that even though AI has the potential to structurally change higher education services, the realm of teaching and learning in higher education is still far more complex, and as a result, AI solutions may not be able to fully automate the industry. There is a concern about the possibilities of AI in PHEIs, but it is important to remember that there are real limits with regards to AI solutions.

4.3 Theme 3: The global perspective of employee perception of artificial intelligence on job security

Two views primarily dominate discussions with regards to the impact of AI, and in particular the effect it has on the automation of industries (Dahlin, 2019). The displacement view suggests that employees who perform routine tasks are at a higher risk of being adversely affected, while those who engage in cognitively complex tasks will remain to a certain extent immune (Dahlin, 2019). For instance, an employee that works on an assembly line has a higher chance of being replaced by a robot compared to that of a marketing executive whose job is to create emotionally compelling advertisements (Dahlin, 2019).

An extreme version of this view highlights that, with the continuous improvement of AI, intelligent machines will render humans completely unnecessary within the workplace (Dahlin, 2019). What was thought to be science fiction is most certainly becoming a reality in certain environments (Dahlin, 2019). AI already undertakes tasks such as detecting medical conditions, engaging in conversation, and driving (Dahlin, 2019). According to Brougham and Haar (2018), the rise of AI could create an environment of mass unemployment and have indicated that one-third of jobs that exist today could be lost by 2025. This is due in part to the significant improvement of intelligent systems and inexpensive autonomous units that could potentially outperform humans at many conceptual tasks (Brougham & Haar, 2018).

Kumari and Hemalatha (2019) provide a contradicting view that suggest that intelligent systems may increase the demand for human labour by enabling job growth. For example, as artificial intelligence is applied to education, the best outcome will come from the combination of human capabilities and AI strengths (Rouhiainen, 2019). Therefore, there will never be a time when tasks related to education do not require human interaction and critical thinking (Rouhiainen, 2019). What is notable about this point of view is that it illustrates collaboration between AI and employees in an environment that is considered to be vulnerable to displacement by intelligent systems (Dahlin, 2019). More importantly, the two contradicting perspectives provide for an intense debate around the application of AI in education. Therefore, additional experimentation and research are necessary for the successful implementation of AI tools throughout PHEIs (Rouhiainen, 2019).

4.4 Conceptualisation of Key Terms

Concept	Connotative	Denotative
Artificial intelligence (AI)	Artificial intelligence can be defined as the development of several analytical tools that collectively attempt to exhibit intelligent behaviour (Altinay,	An umbrella term that is used to describe a range of technologies.

	Karaatmaca & Altinay, 2019; Gordon, 2011).	
Machine learning	Machine learning is a section of computer science that would allow computers to learn new behaviour based on empirical data (Alpaydin, 2016).	A subfield of AI.
Intelligent tutoring systems (ITS)	An intelligent tutoring system is a computer-based program that utilises artificial intelligence for the purpose of providing individualised instruction (Bouchard, 2019).	For the purposes of this study, it is a software application tool that can be used in PHEIs.
Higher education	Higher education can be identified as the process of developing the skills necessary in order to contribute to society (Prodan, Maxim, Manolescu, Arustei & Guta, 2013).	For the purposes of this study, it can be identified as an institute where people work and study.
Job security	Job security is the process of keeping employees from a state of unemployment, in which indirect suffering may occur as a result of the costs associated with not having a job, such as the implications towards their social and economic status (Zhang, Li, Liu & Hu, 2020).	For this study, job security refers to the risk associated with AI on PHEIs. For example, the introduction of ITS.
Private Higher Education institutions (PHEIs)	Private higher education institutions can be identified as a non-state sector in higher education, which indicates that they are owned by private individuals or organisations and	Within this research study, PHEIs is the area of focus when it comes to the application of AI technologies.

	would therefore not typically receive or rely on government funding for expansion (Buckner, 2017).	
Teaching	Teaching is the process of carrying out multiple tasks for the purpose of leading the learners to the desired outcome (Harris, 2018).	Within this research study, a teacher is referred to as an employee currently working at a PHEI.

5. Research Methodology

5.1 Research Paradigm (Worldview)

A paradigm can be identified as a cluster of beliefs that are used in order to identify what should be studied, the manner in which research should be done, and the way in which results should be interpreted (Bryman, 2012). An important aspect to understand is that by following a specific research paradigm, a researcher would have to conduct an investigation that is relevant to their field of study (Plooy-Cilliers et al., 2014). The paradigm identified by the researcher would ultimately influence the types of questions asked, what research processes may be required, and the importance of elaborating on various concepts and themes (Plooy-Cilliers et al., 2014).

Positivism can be defined broadly as the natural sciences approach (Plooy-Cilliers et al., 2014). This paradigm advocates that the researcher would need to concentrate on being objective and factual when seeking to interpret and explain social phenomena (Crowther & Lancaster, 2008; Plooy-Cilliers et al., 2014). Positivism is not an appropriate paradigm for the current research study as the main concern of this study is that of employees perceptions, which would imply feelings and subjectivity. Instead, the research study would utilise the paradigm of interpretivism which would be a far more suitable approach. Interpretivism was developed as a result of the limitations associated with that of positivism, specifically with regards to its application in the field of social sciences (Plooy-Cilliers et al., 2014). Interpretivism differs from positivism as this paradigm takes

on the approach that people are fundamentally different from objects (Plooy-Cilliers et al., 2014). This means that a different approach would have to be taken as human beings are continuously changing as a result of the influencing nature of the environment around them (Plooy-Cilliers et al., 2014).

Researchers of the interpretivist paradigm state that the study should focus on describing the importance of social action in order to understand human behaviour (Maree, 2016; Plooy-Cilliers et al., 2014). Interpretivists believe that reality is socially constructed rather than objectively determined, and it is therefore assumed that by studying people in their natural environment, there is greater opportunity to better understand the perception of people's reality (Maree, 2016; Wahyuni, 2012). Therefore, interpretivism is the ideal paradigm to use in the research study as it focuses on individuals (humans) social reality by looking at the world through the eyes of different participants in order to get a better understanding of their thoughts and feelings towards a phenomenon.

The ontological position of interpretivism can also be related to that of the studies subject matter. Ontology would refer to the study of being, existence or the nature of reality, and identifies questions pertaining to what reality is and how people determine what is real (Plooy-Cilliers et al., 2014; Maree, 2016). Interpretivists do not view reality as being objectively determined, but instead as a social construct that is specifically unique to each individual depending on the meanings associated with their experience (Plooy-Cilliers et al., 2014). In this study, the researcher is going to explore the different perceptions of people regarding the phenomena of AI towards job security. The research study will rely on the idea that people experience phenomena differently and would therefore record their subjective experience on the matter.

The methodological position of interpretivism is also significant within the research study. Interpretivists focus on gaining an in-depth understanding of multiple realities and are therefore reliant on qualitative research designs to accomplish their goal (Plooy-Cilliers et al., 2014; Wahyuni, 2012). Qualitative research emphasises the use of words and experiences rather than numbers in the collection and analysis of data (Plooy-Cilliers et al., 2014). This means that

reality is studied subjectively which indicates that the data collection and analysis methods are context-sensitive and will come in the form of in-depth interviews and focus groups. This study explored employees perceptions, and as a result, required the researcher to utilise the method of semi-structured interviews in order to collect information, and thematic analysis for the purpose of analysing the data, thus aligning with the methodological position of interpretivism.

5.2 Research Approach/Design

A research design can be identified as a plan that transitions from an underlying philosophical assumption to that of specifying the selection of participants as well as the methods required in order to gather and analyse data (Maree, 2016). The choice of research design influences the manner in which data is collected, the research practices and skills, and the epistemological and ontological perspective of the researcher (Maree, 2016). Currently, researchers have a wide range of designs from which to select, however, it would need to be congruent with their research question as well as appropriate for the purpose of gathering information required in order to answer the research question posed (Maree, 2016).

The study used qualitative research methods instead of quantitative methods as the study sought to record data based on the perceptions and experiences of employees, which can be identified as subjective in nature rather than factual. The collection of data by the researcher was conducted through semi-structured interviews as the researcher aimed to explore how the perception of employees at private higher education institutions are shaped based on the introduction of AI. Semi-structured interviews were suitable as a qualitative research method as it assisted the researcher in terms of collecting, analysing, and explaining the data within the context of the study.

The qualitative methods that were selected would allow for the topic of quality to be addressed while at the same time dealing with issues such as effectiveness and practicality (Maree, 2016). The use of qualitative research would allow for mutual understanding between the participant and the researcher in terms of the concepts and perceptions discussed within the study (Maree, 2016). Therefore, by incorporating qualitative research methods within the context of the study the

researcher would be able to take into consideration meanings, perceptions, and messages (Maree, 2016).

The researcher conducted explanatory research which has been used in order to obtain an explanation for a specific phenomenon and would therefore not offer conclusive solutions to existing problems (Plooy-Cilliers et al., 2014). This type of research is usually conducted to identify the consequences of research problems, to study a key concept that has not been clearly defined, and to gain new insights into existing problems (Plooy-Cilliers et al., 2014). This study is explanatory as it is aimed at finding out what Varsity College Sandton employees think and believe regarding their perceived reasons as to how AI could affect their job security.

The research study will be conducted in a cross-functional manner which will ensure that it focuses on creating an overall image of a phenomenon that is occurring at a given point in time (Maree, 2016). This would require the researcher to collect data from a selected group of participants within a given time frame (Cherry, 2018). A cross-sectional study is observational in nature which means that it can be used to determine the cause of certain variables (Cherry, 2018). This type of research would be able to describe the characteristics that exist within a given community but would not be able to determine the cause-and-effect relationships between different variables (Cherry, 2018). This method will be utilised in order to make assumptions about possible relationships or for the purpose of collecting data that can be used to support further research and experimentation (Cherry, 2018). This is relevant to the research study due to the fact that it discusses employee perceptions and would therefore require the observation of a selected group of participants in order to draw a conclusion on whether or not employees perceive AI as a threat to their job security. In addition, the researcher does not intend to determine the long-term effects of an intervention as this would require a longitudinal study.

Finally, this study would follow a deductive line of reasoning due to the fact that it shifts from a broad theoretical foundation of the Herzberg's motivator-hygiene theory and equity theory to that of a narrower and more specific outcome: the findings of the investigation.

5.3 Population and Sampling Methods

5.3.1 Unit of Analysis

Plooy-Cilliers (2014) suggests that the unit of analysis can be identified as the smallest component that can be explored for the purpose of collecting data in a research study. The unit of analysis for this study is the current employees working at a private higher education institution.

5.3.2 Target and Accessible Population

According to Plooy-Cilliers (2014), a target population would refer to the entire group of entities or individuals from which information is required. The target population of this study consists of employees who are working at a private higher education institution.

The accessible population would refer to the unit of analysis that can be included within the researcher's target population (Plooy-Cilliers et al., 2014). The accessible population of this study consists of employees currently working at a private higher educational institution and who are available for semi-structured interviews.

5.3.3 Population Parameters

The parameters of this study are:

- Employees currently working at a private higher education institution in the year 2020
- Male and female lecturers at a private higher education institution
- Employees between the ages of 25 and 40
- Employees that have worked at a private higher education institution for more than six months
- Employees who are available for semi-structured interviews

5.3.4 Sampling

Sampling can be defined as the process of identifying the population parameters by means of distinguishing between the target population and the accessible population (Plooy-Cilliers et al., 2014). Sampling would

allow the researcher to develop a list of individuals from which to contact for the purpose of data-collection (Plooy-Cilliers et al., 2014). The type of sampling utilised is dependent on the research study as probability sampling will give every unit within the population an equal chance of being selected, whereas non-probability sampling takes into account that not every unit will have an equal chance of being selected (Plooy-Cilliers et al., 2014). Therefore, the following research study made use of non-probability sampling. The reason for this type of sampling method is due to the limited amount of resources and time constraints, as it is extremely difficult to utilise and gain access to the entire population as well as the impossible nature of determining who the entire population is (Plooy-Cilliers et al., 2014). In the context of this study, it would be almost impossible for the researcher to gain access to all employees who work at a private higher education institution, and who are aware of the affects brought about by AI.

The use of non-probability sampling would indicate that not all members of the population will have an equal opportunity to participate in the research study (Plooy-Cilliers et al., 2014). Therefore, the focus is on the number of employees that the experimenter will need to interview rather than the significance of the representatives to gain an in-depth understanding of the research problem.

The study has made use of purposive sampling. According to Maree (2016), purposive sampling can be utilised within special situations where specific characteristics are required for members of a sample to be selected. More importantly, the aim of utilising this method would allow for the identification of as many components as possible (Plooy-Cilliers et al., 2014). Ultimately, this will provide for an advantage as the data collected will be able to assist in answering the research question by ensuring that only individuals who fit within the population parameters will be able to participate in the research study (Maree, 2016). These parameters will allow for the specific collection of data such as the perception employees have towards AI and job security.

5.3.5 Sample Size

A sample size can be identified as the direct count in relation to the number of samples being measured and observations being made (Maree, 2016). For the purpose of this qualitative study, the researcher used a sample of four employees at a private higher educational institution. The main focus of this study is the utilisation of non-probability sampling which is the number of employees needed by the experimenter for the purpose of gaining an in-depth understanding with regards to the research problem in relation to the studies research objectives.

5.4 Data Collection Method

Data collection is considered to be one of the most important aspects within a research study as it will have an impact on the final result. If the data collection method is unethical or the incorrect data is collected then the results of the study will be invalid. Therefore, the researcher used semi-structured interviews which allowed for the collection of information based on questions posed to participants with the aim of learning more about their opinions, views, beliefs, and perceptions (Plooy-Cilliers et al., 2014). With the use of semi-structured interviews, the researcher was able to collect data and explain the significance of AI in higher education and the affect it has on the employee perception of job security.

The method of interviews allowed for two-way communication between that of the participant and the researcher which ensured that questions were clarified where necessary. As perceptions are subjective in nature, there were several instances that required the researcher to ask participants for a more detailed explanation around the study. The researcher also took into account non-verbal cues when interviewing participants.

The researcher compiled a standardised interview guide, which asked a set of open-ended questions to all the participants that were selected based off of the population parameters. The interview guide ensured that the questions were developed and detailed in advance which allowed for probing through the use of follow up questions in order to better understand the opinions and beliefs of the participants with regards to certain phenomena (Plooy-Cilliers et al., 2014). This

assisted with the data analysis section of the research study as it helped the researcher identify themes and patterns raised by employees. The interview guide also helped the researcher compare the perceptions and answers of the participants in a structured and organised manner (Maree, 2016). Even though the semi-structured interviews were time consuming, the researcher was able to obtain the necessary data for the study in the limited time frame by ensuring a small sample size.

The researcher conducted the interviews in Gauteng over the period of August 2020. The interviews were conducted through online Zoom Calls and Microsoft Teams. The researcher used a recording device and the standardised interview guide in the interviews. The researcher organised appointments with previously and purposively selected participants who matched the population parameters and that were available within the month of August 2020. The participants were asked if they were willing to partake in the interview process. The participants were informed that the interviews are voluntary and would take approximately 15 to 30 minutes of their time. After ensuring that the participants were willing to take part in the research study and that they fitted the population parameters, the researcher asked participants to fill in a consent form that assured them of confidentiality, and a brief background was provided with regards to the context of the study. The researcher then tested the recording device to make sure that the sound was clear and audible. Following this, the interview started in which the researcher asked predetermined questions and recorded their answers.

The questions in the semi-structured interview guide shifted from a fairly broad approach to that of a narrow focus – starting with questions that can be linked to the larger research topic and becoming increasingly specific in nature by addressing the studies objectives directly. The researcher was flexible in terms of the conversations direction. However, if the conversation moved too far away from the research topic, the researcher shifted the conversation back.

The questions were open-ended, clear, and simple. The researcher made sure that they did not project their opinion, bias, or understanding of the research topic on the participants' answers, but instead remained neutral and asked for

clarification if there was confusion with regards to the participants' interpretation of the questions being asked.

5.5 Data Analysis Method

A qualitative data analysis method was used throughout this research study as the researcher had to analyse text from transcriptions that were taken from the recordings of semi-structured interviews. Therefore, the data analysis method that was used in this study was that of thematic analysis. Thematic analysis is a method that allows for subjective interpretation of data that has been collected and analysed through systematic classification processes for the purpose of recognising themes, patterns, or codes within transcriptions (Plooy-Cilliers et al., 2014). Thematic analysis will allow for the allocation of defined steps within the methodology for the purpose of guiding the researcher in terms of assessing the data, determining the themes, and reporting the findings with validity and clarity (Miller, 2020). The data analysis method undertaken is also hermeneutic as the qualitative research study focused on the examination of conversation and written words with regards to the interpretation of meaning associated with the answers given by the participants (Plooy-Cilliers et al., 2014). This research was subjective in nature as the researcher interpreted the textual data from his personal frame of reference. However, the researcher focused on remaining as objective as possible while allowing for some subjectivity in relation to the data analysis process.

Plooy-Cilliers et al (2014) have identified an eight-step process that has been developed for qualitative thematic analysis which will be beneficial for the study. However, the steps have been altered in relation to the relevance of the studies research.

Step (1): The data was prepared by the researcher.

Step (2): A definition and analysis of the coding unit took place.

Step (3): A conceptual framework or coding scheme was developed in order to assist with the coding of data. The themes selected were clear, systematic, and specific.

Step (4): This process involved testing the coding scheme on a sample text to ensure that the themes selected fitted within the interview transcripts produced and would therefore remain consistent throughout all four interview transcripts.

Step (5): The coding of the data was conducted through thematic coding, open or substantive coding, selective coding, and axial coding.

Step (6): At this stage it was important for the researcher to assess the level of consistency from which the coding was conducted.

Step (7): This required the researcher to interpret the categories and themes. This involves three steps such as explaining the relationships found, taking into consideration extraneous information, and through the identification of relevant factors that may affect the research problem for the purpose of avoiding false interpretations.

Step (8): This is where the researcher will have to report the findings in a way that is objective, comprehensive, and honest.

An example of the method the researcher took from steps 1 to 6

The researcher started by organising and transcribing the raw data collected to that of written text before the analysis could take place. This approach involved transcribing the four interview recordings. After the raw data was transcribed, the researcher was able to read through the text for the purpose of getting a better understanding of the content received from the participants. An important note is the fact that the researcher focused on eliminating irrelevant information that was provided by the participants.

The next step by the researcher involved typing each question individually and underneath it the corresponding answers given by each of the participants. This provided a platform that allowed the researcher to visually contextualise the raw data given. Once this was achieved the researcher was able to identify, group, and tabulate specific themes. An example of how this coding process took place has been provided below through the identification of a sample question.

Question 10:

Would you say artificial intelligence is the future of higher education?

RA	Respondent A	RC	Respondent C
RB	Respondent B	RD	Respondent D

RA: Yes. The first thing that comes to mind is student support. I think that one could use AI to identify patterns that can accommodate students.

RB: Yes.

(Prompted response) please elaborate on your answer. While I do not think machines will be able to replace face-to-face teaching, I think the potential for AI to assist and enhance teaching and learning is high.

RC: Yes it is the future. Computers could be used to teach difficult concepts to students. It could be used in conjunction with a face-to-face lecturer.

RD: Quite possibly. The reality is that AI will form part of higher education.

(Prompted response) please elaborate on your answer. Whether this will be the future of higher education is still to be seen.

The next phase will focus on identifying themes (subthemes) to establish a code for those themes.

Optimisation - Identify patterns - Teach difficult concepts	01
Processing Systems - Student support - Accommodate students - Assist and enhance teaching and learning	02
Teaching and Learning I do not think machines will be able to replace face-to-face teaching	03

• It could be used in conjunction with a face-to-face lecturer • AI will form part of higher education	
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Decoded the data collected

RA: Yes. The first thing that comes to mind is **student support**. I think that one could use AI to **identify patterns** that can **accommodate students**.

RB: Yes.

(Prompted response) please elaborate on your answer. While **I do not think machines will be able to replace face-to-face teaching**, I think the potential for AI to **assist and enhance teaching and learning** is high.

RC: Yes it is the future. Computers could be used to **teach difficult concepts** to students. **It could be used in conjunction with a face-to-face lecturer**.

RD: Quite possibly. The reality is that **AI will form part of higher education**.

(Prompted response) please elaborate on your answer. Whether this will be the future of higher education is still to be seen.

The written code

Respondent	Question
RA	01,02
RB	02,03
RC	01,03
RD	03

The table above assisted the researcher in terms of finding patterns in the data. More importantly, from the table the researcher was able to see that 75% of the participants related their answers to the theme of teaching and learning. On the other hand, the remaining 25% related their answers to that of optimisation and processing systems. The previously stated process was carried out on all of the open-ended questions within this research study.

An example of the method the researcher took from steps 7 and 8

After all of the data was coded and tabulated, the researcher started identifying patterns within the responses and drew a conclusion from the coded data within the table. This interpretation involved three steps such as the explanation of the relationships found within the data and across texts, by taking into consideration extraneous information, and by identifying all the relevant factors that may alter the research problem in order to avoid false interpretations (Maree, 2016). The final step allowed the researcher to report their methods and findings outlined above in a manner that is objective, comprehensive, and honest. Therefore, the data collected from the four interviews referring to the employees perceptions with regards to the research problem and objectives assisted the data analysis section in terms of organising the information taken from the transcriptions and through the formulation of findings for the research study.

6. Trustworthiness

Qualitative research will not allow for the use of numbers, instead the researcher will have to implement different measures for the purpose of determining the reliability, trustworthiness, and credibility of the research findings (Plooy-Cilliers et al., 2014). This type of research aims to promote an in-depth understanding regarding the phenomenon of employees perceptions towards AI and job security. However, the repetition of a qualitative study to get the same results would be impossible due to the fact that the answers given by the participants cannot be measured objectively, since it is unique to each individual's experience (Plooy-Cilliers et al., 2014). The concept of trustworthiness can be broken down into four specific categories such as credibility, transferability, dependability, and confirmability (Plooy-Cilliers et al., 2014).

Credibility can be identified as the accurate interpretation of the participants data by the researcher (Plooy-Cilliers et al., 2014). The researchers credibility will increase as long periods of time will be spent with participants in order to gain insight into their lives. The interview process will allow for this time as the researcher will be engaging and interacting with the participants for a 15-30-minute period. The interaction will be beneficial for the researcher in terms of providing clarification to any questions that the participants may have about the study. This interaction would allow the

researcher to better understand the participant as well as their experience. The study will also be seen as credible as the researcher will analyse the information in a way that promotes accuracy. This will eliminate any biased interference during the data collection process.

Transferability will allow the researcher to apply the findings to a similar situation that will allow for the delivery of similar results (Plooy-Cilliers et al., 2014). In other words, this would allow for the extent to which the results and analysis can be utilized beyond a specific research project (Plooy-Cilliers et al., 2014). The study addresses how AI may shift one's perception of job security. However, the transferability of the research study is valid as it discusses the broader spectrum in relation to the manner in which the concept can affect, influence or shift the perception of an individual. Therefore, indicating that AI may have the power to shape societies reality.

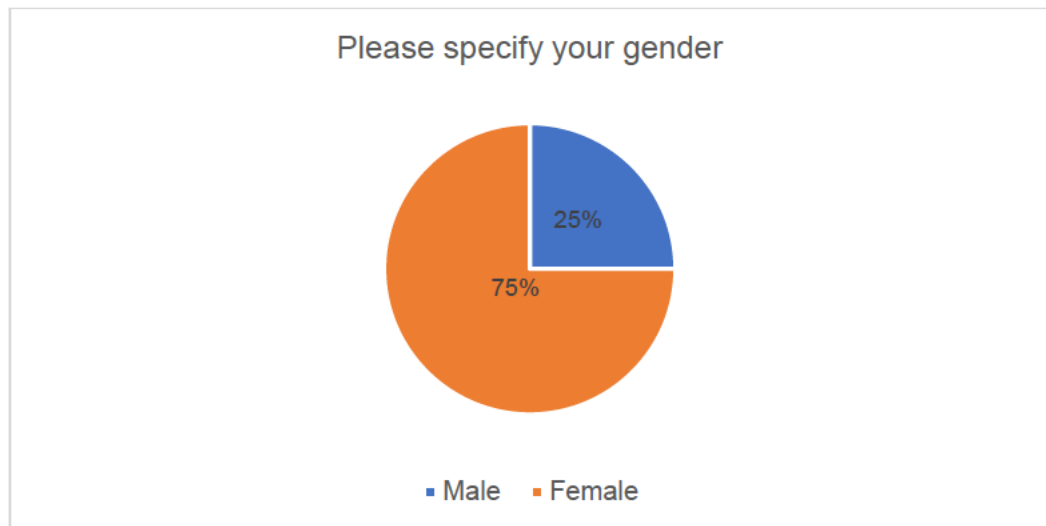
Dependability will take into consideration the quality that takes place when integrating the various methods associated with data collection and data analysis (Plooy-Cilliers et al., 2014). In this research study, the data collection method used was that of semi-structured interviews which incorporated questions that relate to theories like Herzberg's motivator-hygiene and equity theory. The researcher will identify codes from the main themes of the objectives which will provide guidance when interpreting the relevant patterns in the data analysis section of the study. This indicates that there will be a link between these sections which will increase dependability.

The final approach will be that of confirmability which takes into consideration the efficient manner in which data is collected for the purpose of supporting the interpretation and findings of the researcher (Plooy-Cilliers et al., 2014). Confirmability would ensure that the researcher describes the research process fully for the purpose of assisting others in scrutinising the research design (Plooy-Cilliers et al., 2014). Other researchers who interpret the data should come to a similar conclusion to that of the researcher. In terms of this research study, the researcher has thoroughly outlined all the necessary sections such as the research problem, research question, population, data collection, and design, among others. The researcher has done this in the hope that it will assist other researchers in examining this research.

7. Findings and Interpretation of the Findings

This section will outline the research studies findings. The findings identified will refer to the data that has been collected from the four semi-structured interviews. The interpretation of the findings will also take into account the literature as well as the theoretical approach with regards to the research study.

7.1 Question 1: Please specify your gender



It is evident that 25% of the respondents within the research study are male, whereas 75% of the respondents are female.

7.2 Question 2: Please specify your age

Gender	Age	Number of Respondents
Male	25-30	1 Respondent
Female	31-45	3 Respondents

It is evident that 25% of the respondents are between the ages of 25 to 30 and 75% of the respondents are between the ages of 31 to 45.

7.3 Question 3: Please indicate your years of experience in this position

	Gender	Years of experience
Respondent A	Male	1-2 years
Respondent B	Female	2-5 years
Respondent C	Female	6-10 years
Respondent D	Female	6-10 years

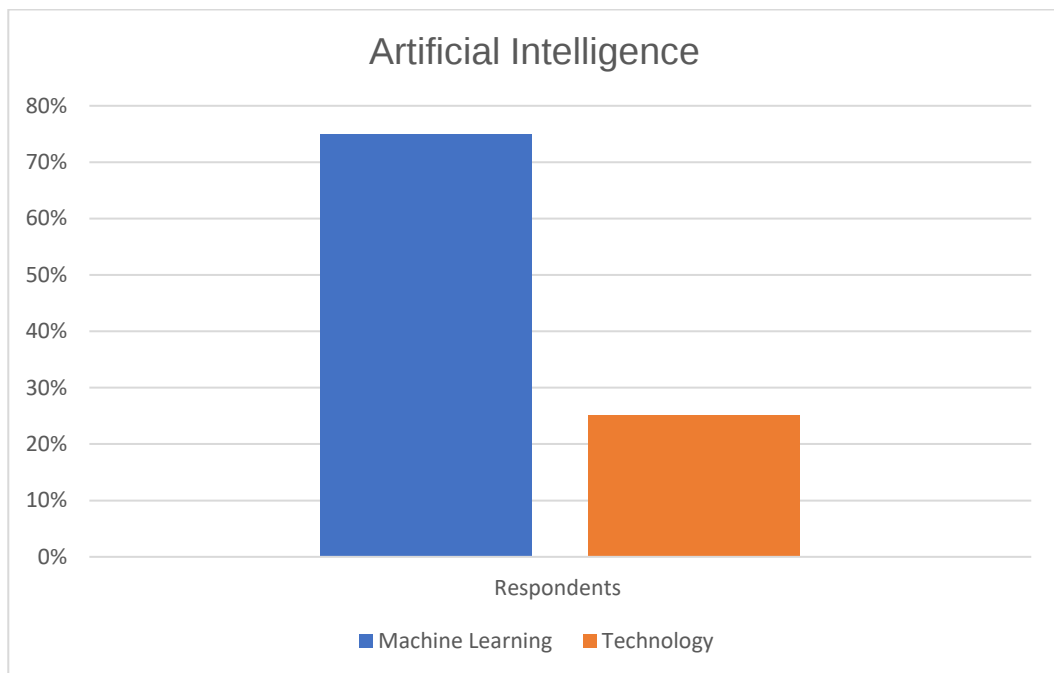
Respondents were asked to please indicate their years of experience within a lecturing position. Respondent A (25%) indicated that they have 1-2 years of experience. Respondent B (25%) indicated that they have 2-5 years of experience. Finally, Respondent C and Respondent D (50%) indicated that they have 6-10 years of experience.

7.4 Question 4: How would you describe artificial intelligence?

The next question asked the respondents to provide a description of AI from their frame of reference. Three out of the four respondents (75%) indicated that they view AI as a computer that can simulate human like behaviour and intelligence within a machine. Whereas respondent A (25%) indicated that they view AI as a replication of human intelligence into a machine. This can be exhibited in the respondents detailed response:

“I would define AI as a replication of human intelligence into a machine. This is mainly done to mimic the actions or behaviours of humans. It may also be understood as a machine that exhibits traits associated with the mind of humans such as learning and problem solving. An example of AI would stem from YouTube learning a pattern from the channels you subscribe to and using that pattern to recommend videos that it “thinks” you would be interested in watching.”

According to Ocaña-Fernández et al (2019), the discussion around AI can be identified as a major subject that supersedes many current trends, but only a small percentage of the population actually understand it. However, the research studies findings appear to contradict this assumption as all of the participants indicated some level of awareness in relation to the concept of AI.

7.5 Question 5: Which one of the following comes to mind when you think of artificial intelligence?

The respondents were given a number of options in relation to the previous question such as machine learning, intelligent tutoring systems, technology, and none of the above. 75% of the respondents said that machine learning came to mind when they thought of AI. Whereas 25% said that technology came to mind when they thought of AI.

Zawacki-Richter et al (2019) states that AI and machine learning are often mentioned within the same field of study. This has been indicated within the research study as 75% of the participants selected machine learning. This is a result of the fact that technology does not prescribe to a single field of study, but instead is an umbrella term that is used in order to describe a range of technologies and methods (Zawacki-Richter et al., 2019).

7.6 Question 6: Would you say artificial intelligence is the future of higher education? Please elaborate on your answer

A strong theme that emerged here can be linked in relation to the overview of AI in a global context. This has been made evident in the findings as 75% of the respondents believe that AI will be used to “identify learning patterns that can accommodate students.” This statement was supported by another participant

who highlighted that “computers could be used to teach difficult concepts to students.” Even though the majority of participants are certainly convinced about the use of AI in higher education. Participant D (25%) has stated that they are not entirely convinced on whether this is the future of higher education as indicated in her response: “Quite possibly. As we make a shift to implementing more and more technology, the reality is that AI will form part of higher education. It is the next logical step. However, whether this will be the future of higher education is still to be seen.”

The variation in the previous responses supports a number of authors who believe that the understanding of AI has become increasingly differentiated specifically with regards to the discipline of teaching and learning in higher education (Renz & Hilbig, 2020). This is linked to the theoretical framework of the study in terms of the Herzberg’s motivation-hygiene theory due to the fact that participants will interpret the use of AI in higher education from their own unique frame of reference.

7.7 Question 7: What do you think are the advantages of using artificial intelligence in higher education?

Based on the findings, 100% of the respondents believe that AI will be able to optimise the higher education industry. This can be highlighted within the responses as the participants indicated that AI would be able to “streamline systems and processes.” Therefore, from the above it can be deduced that all of the participants agree to the optimisation of AI which is interesting as this relates to the theme of artificial intelligence and job security as various authors have indicated that technology has the ability to optimise a number of diverse activities (Ocaña-Fernández et al., 2019).

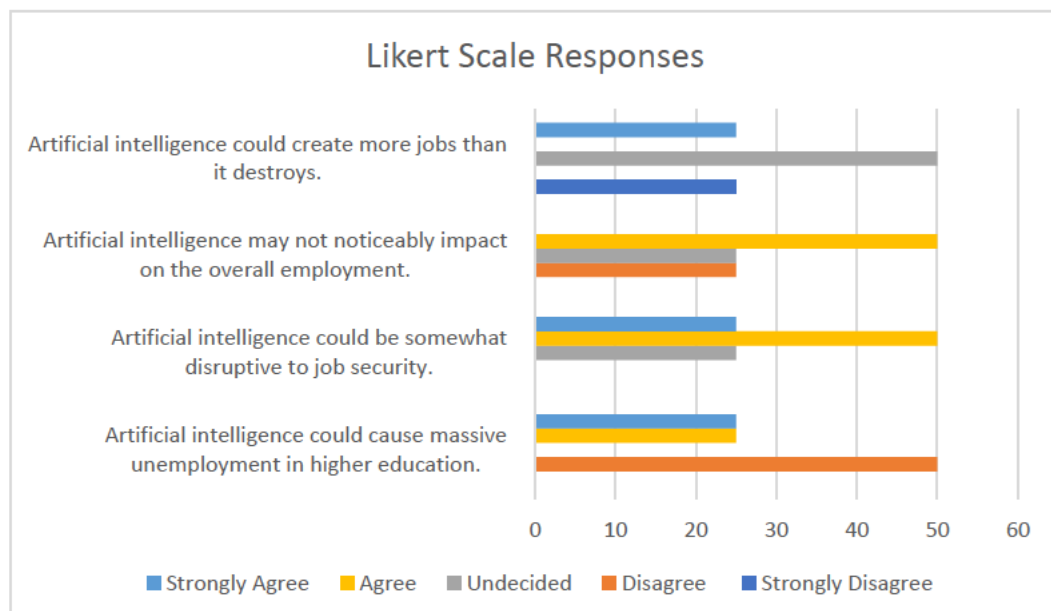
7.8 Question 8: What do you think are the disadvantages of using artificial intelligence in higher education?

Based on the findings, it can be highlighted that all of the participants have a negative view towards AI. 75% believe that the introduction of AI will lead to a “loss of human touch and interaction.” While 25% believe that AI would lead to a “fear of job losses.” The equity theory supports these views due to the fact that if

an employee believes that AI will lead to unfair treatment such as a lack of interaction, then this could lead to an employee leaving the firm which ties to that of unemployment.

7.9 Question 9: On a scale of 1-5, how would you rate the following statements with regards to artificial intelligence and job security?

The next question used a Likert Scale to rate the following statements from 1-5 in terms of strongly disagree, disagree, undecided, agree, and strongly agree. The illustration below will highlight the participants responses with regards to the question:



Statement 1: This aspect will focus on precisely addressing the fact that AI could cause massive unemployment in higher education. It can be indicated that 50% of the participants disagree with this statement compared to that of participant C (25%) who agreed, and participant D (25%) who highlighted that they strongly agreed. Nevertheless, the literature has been able to offer supporting evidence in relation to the two participants answers as Popenici and Kerr (2017) have shown that AI solutions will not be able to completely automate the industry.

Statement 2: This aspect will focus on addressing the fact that AI could be somewhat disruptive to job security. 50% agree with this statement whereas respondent D (25%) strongly agrees. However, it should be highlighted that

respondent A (25%) remains undecided. This can be highlighted within the literature as ITS can be used in PHEIs which may present various issues in relation to job security.

Statement 3: This aspect will focus on addressing the fact that AI might not noticeably impact on the overall employment. 50% of the participants agree with this statement. However, respondent B (25%) disagreed, and a further 25% being respondent D remained undecided. From the previous findings, and with supporting evidence from the literature, it could be presumed that 50% of the respondents believe that the realm of teaching and learning can be seen as still far more complex, and as a result, AI solutions will not have a noticeable impact on the overall employment.

Statement 4: This aspect will focus on tackling the fact that AI could create more jobs than it destroys. 50% of the respondents are undecided. Though, respondent C (25%) strongly agrees whereas respondent D (25%) opposes this point of view by strongly disagreeing. From the above findings, and with supporting evidence from the literature, it can be highlighted that two views are present as respondent D suggests that employees at PHEIs are at risk of being adversely affected, whereas respondent C suggests that AI could increase the demand for human labour (Dahlin, 2019; Kumari & Hemalatha, 2019).

7.10 Question 10: Do you think there is a link between artificial intelligence and job security in higher education?

100% of the respondents indicated that there is a link between AI and job security in higher education. Respondent A provided a detailed response which can be exhibited below:

“Job insecurity is more likely to be increased when someone does not have the capacity to learn/adjust to working with technology.”

The literature supports this view as AI poses enormous problems due to the speed and scope in terms of those possible impacts (Ocaña-Fernández et al., 2019). Thus, the above findings suggests that employees are aware of the

potential risk factors that they are exposed to as a result of the inevitable technological advances which are emerging at an increasingly accelerated rate.

7.11 Question 11: What is your perception of artificial intelligence and job security in higher education?

Based on the findings, 50% of the participants provided a positive view of AI in higher education. Respondent C indicated that “lecturers could spend more time researching.” Whereas the other 50% provided a negative view of AI in higher education. Respondent D indicated that “some people will fear a loss of their livelihoods.” This relates to the theoretical framework in relation to the Herzberg’s motivation-hygiene theory as the motivation of employees can be influenced based on the changes occurring within the hygiene and motivator factors.

7.12 Question 12: What do you think higher education institutions can do to overcome the employee perception of artificial intelligence towards job security?

Based on the responses, all of the participants proposed that education was the most appropriate method to promote AI. However, on zooming into the how factor, there was a split between the respondents whereby 50% stated that employees should be informed about the benefits of AI, whilst the other 50% proposed that transparency would be key. Yes both suggestions have provided relevant information, however, the fact that all believe education was key aligns with Rouhiainen’s (2019) view that further research is necessary for the successful application of AI tools throughout PHEIs.

8. Ethical considerations

Ethics can be identified as a matter of integrity which governs an individual’s behaviour on a personal level, however, the implications associated with ethics extends much further than the individual (Plooy-Cilliers et al., 2014). A lack of ethics within research could affect the numerous stakeholders invested in the research process (Plooy-Cilliers et al. 2014). The typical stakeholders that need to be taken into consideration within the research study are the participants, the community, the broader public, academic institutions, and researchers (Plooy-Cilliers et al., 2014).

A researcher who acts in an integral manner would adhere to the ethical principles and professional standards that are imperative for conducting research in a responsible way (Plooy-Cilliers et al., 2014). It is the commitment of an individual to act in a respectful and trustworthy manner, even in the presence of adversity (Plooy-Cilliers et al., 2014). Thus, ethics is extremely important as it creates a moral and professional framework that sets a standard for an individual's attitudes and behaviour (Plooy-Cilliers et al., 2014). More importantly, ethical considerations are vital in the research process of any study. Therefore, several points have been identified below for the purpose of addressing the ethical concerns of this study.

A) Informed consent

The participants should be aware of the fact that they are taking part in a research study (Plooy-Cilliers et al., 2014). A consent form will be produced which will be made compulsory for all participants to complete before engaging in the research study (Plooy-Cilliers et al., 2014). They should be formally informed in order to clearly understand what is going to be required of them during their participation, the manner in which their identities will be protected, and the way in which the results will be used (Plooy-Cilliers et al., 2014). This will be made evident throughout the study as the researcher would first have to discuss the research topic and the manner in which it will be tested. It is important that the participants have an interest in the topic being researched as the researcher is obligated to identify that the participation is voluntary. Individuals are more likely to be open and honest in their participation if their willingness to take part in the research increases.

B) Confidentiality versus anonymity

Research participants have important concerns with regards to the protection of their identity and sensitive information, as the research study may record information about them that may lead to physical, emotional, relational and occupational harm (Plooy-Cilliers et al., 2014). A certain number of people want their identities protected as a matter of principle and are not concerned about sensitive information (Plooy-Cilliers et al., 2014). Another reason may be the fact that participants fear the exploitation of their contact information by the researcher or additional parties for the purpose of marketing (Plooy-Cilliers et al., 2014). It is

therefore important to ensure that if the participant does provide their details such information will remain confidential and to also give the participant the choice of remaining anonymous. However, the interviews lack anonymity within the research study. This means that individuals tend to be less honest if the topic is sensitive which may affect the trustworthiness of one's findings. Therefore, when conducting the semi-structured interviews the experimenter would need to remain ethical and ensure the anonymity of the participant's.

C) The use of the Harvard referencing guide in order to acknowledge the work of other authors

The research study would need to create a new insight or building block with regards to existing concepts. Therefore, it is important for the researcher to reference the work of other authors for the purpose of avoiding plagiarism.

D) The avoidance of offensive, unacceptable or discriminatory language in the formulation of research questions

It is important to identify that any use of offensive, unacceptable or discriminatory language may result in the unwilling participation of the participant in the research study. This may also result in a negative view towards the study by the participant. Once the study is viewed in a negative manner individuals would stray away as they do not want to be associated with the study. This could result in the prevention of data collection from participants which will have an effect on the research study.

E) Maintaining objectivity throughout discussions and research analysis

It is important to provide evidence in order to justify what is being said throughout the research study and if evidence has not been provided, then no argument can be proven. In any form of discussion, it is important to ensure that all information has been provided and that nothing has been altered or purposively left out for the purpose of ensuring that the study is detailed. This will allow for an understanding of what is being said for those reading the research study. Therefore the study should not distort results in order to benefit the researcher, falsify information or engage in bias conversations.

9. Limitations

Limitations can be described as potential limits or constraints that are outside of the researchers control (Plooy-Cilliers et al., 2014). When limitations are clearly identified this will help support the researcher in terms of the trustworthiness of the findings within the scope of the study (Plooy-Cilliers et al., 2014). The availability of resources will be limited in this study as the number of participants that are interested and willing to partake in the study may be inadequate. The assessment of data by the researcher may be restricted as participants might be unwilling to accommodate the study due to other commitments or work factors. The lack of control with regards to set variables will also be a limitation in terms of unexpected time constraints experienced by participants which could result in less effort with regards to the interviews.

Accessibility will also be a limitation in the study as the researcher will only be able to access individuals that fall within the population parameters. This indicates that there could be an element of researcher bias as a result of contextualising the findings to that of available participants. This will provide an opportunity for future researchers to extend the research study by conducting interviews with participants that fall outside of this study's accessible population. In addition, the researcher and the participants are restricted in terms of travel due to the coronavirus. This will require the researcher to use online platforms in order to manage the data collection process.

Time is an important limitation within the study as the researcher will only have a two-month period in order to collect the data. The researcher will be restricted with regards to travel and the participants' work schedules. This would require the researcher to use a small sample size in order to manage the process of collecting data. Lastly, resources will be limited as the study will only include one researcher in the interview process. This is why the sample size of six employees will be selected. If the study included additional researchers within the data collection and analysis phase, more information could have been recorded and interpreted which would allow for the selection of a larger sample size. In addition, researchers that insist on expanding on the current study could do so by using a larger team which would allow for a larger sample size in order to counteract this limitation.

10. Conclusion and Recommendations

The conclusion will focus on discussing each of the research objectives and the manner in which these will relate to the studies findings. The researcher would also provide recommendations for future research and identify the anticipated contribution of the study. Finally, the researcher will complete the report by addressing the reports success in answering the research problem.

10.1 Discussion of Research Problem, Question, and Objectives

Objective one and two will be addressed below:

Objective one aimed to provide an overview of AI in a global context:

According to Ocaña-Fernández et al (2019), the discussion around AI can be identified as a major subject that supersedes many current trends, but only a small percentage of the population actually understand it. However, through the findings provided it can be concluded that all of the participants exhibited some level of awareness towards the concept of AI. 75% indicated that they view AI as a “computer that can simulate human like behaviour and intelligence within a machine.” The remaining respondents 25% indicated that they view AI as a “replication of human intelligence into a machine.” Thus, the research findings exhibit a contradiction between that of the literature and the data collected.

Objective two aimed to explore the employee perception of AI:

This objective allowed the researcher to answer the question: What are the employee perceptions of AI towards job security in PHEIs?

There were two themes that were present within the research findings. The first theme indicates that 50% of the participants provided a positive view of AI in higher education. Respondent C further indicates that “lecturers could spend more time researching.” The second theme indicates that 50% of the participants provide a negative view of AI in higher education. Respondent D further indicates that “some people will fear a loss of their livelihood.” This provides supporting evidence in relation to the research studies third theme: The global perspective of employee perception of AI on job security. Thus, the answers provided to

question twelve have indicated that two views are primarily dominating discussions in relation to the impact of AI, with specific regard to the effect it has on the industry (Dahlin, 2019).

Objective three and four will be addressed below:

Objective three aimed to assess how employee perceptions of AI influences job security in higher education:

The data that was collected in the research study allowed the researcher to rectify the problem that was previously identified within the study. This was the rising fear among the majority of employees within higher education that high-level machine learning systems will completely replace the job of the teacher. In terms of the research that was conducted throughout the study, it is evident through question ten that 75% of the respondents indicated that they would feel insecure about their jobs as a result of the introduction of AI within higher education. However, it is evident through the responses given in question six as well as the previous literature that AI will be used in order to assist and enhance the teaching and learning experience rather than that of completely replacing the job of the teacher. This is a result of the fact that there are real limitations to the application of AI within the higher education industry.

Objective four aimed to propose solutions on how higher education institutions can overcome the employee perception of AI:

The research questionnaire was able to provide respondents with a chance to propose solutions on how HEI can overcome the employee perception of AI. The data gathered indicated that 50% of the participants believe that the key to overcome the employee perception of AI towards job security is that of education. Respondent A and C support this view by suggesting that the employees should be “informed about the benefits of AI.” However, through the data collected it was evident that there were contradicting points of view as respondent B and D suggested that “transparency would be key.” Thus, Rouhiainen (2019) suggests that further research is necessary to effectively apply AI tools throughout PHEIs.

10.2 Recommendations

As previously highlighted within the limitations section, the research study was limited in terms of access to resources, accessibility, and time. Thus, the researcher will recommend that further research is conducted in relation to the employees perception of AI towards job security in private higher education institutions. This study can be taken further by future researchers through the use of a larger and more diverse sample and by extending the study over a longer period of time. In doing so, the researchers might be able to discover a broader range of perceptions towards AI that have been raised by employees at higher education institutions. The researcher also recommends including individuals within the sample size that have a better understanding of the concept of AI as it is defined for the purpose of this study. This would assist the researchers in relation to acquiring information that is more accurate with regards to the third research objective within this study in terms of the relationship between employees perception of AI and job security.

10.3 Anticipated Contribution

The anticipated contribution to the study can be seen as a method of predicting the findings (Plooy-Cilliers et al., 2014). However, this section will provide an explanation in terms of the anticipated contribution towards the body of knowledge. Therefore, this study will provide further research within the field of business management as it addresses concerns around AI within private higher education institutions, specifically with regards to its ability to influence individual's perceptions of job security. AI is still a relatively new concept, meaning that there is still a lot to be explored with regards to the effect on private higher education, employee perception, and the manner in which it will be utilised by society.

This research study will contribute to the field as a result of localising the research problem within a South African context, meaning it will contribute to South African business management research. In addition, this study will try to decipher employees perceptions towards AI and their responses in terms of the affect it will have on job security. This will provide the reader with additional knowledge

and information with regards to the effects of AI on job security within South Africa and its influence on the perception of individual's.

The researcher aims to draw attention to the influence AI has on employee perception towards job security by increasing awareness that would allow for a more active role in this regard in order to avoid complacency. Therefore, employees will start to create their perceptions towards this specific phenomenon by drawing upon relevant and accurate information.

10.4 Conclusion

This research report conducted a study on the employee perception of AI towards job security in private higher education institutions. The research study integrated a well-established and formulated background, problem statement, question, and research objectives. A literature review was provided in the research study with the integration of credible academic sources, and a clear research methodology was utilised in relation to the study. A relevant theoretical framework was utilised within the research study, and the key terms were conceptualised. The research report also incorporated a discussion on the ethical considerations and limitations and as a result outlined recommendations for future research.

In conclusion, the research study has been effective in terms of addressing the research question and objectives. This study indicates that a large portion of the employees at a private higher education institution would feel insecure about their jobs as a result of the introduction of AI within higher education. However, the research study highlights that AI will be used in order to assist and enhance the teaching and learning experience rather than completely replacing the job of the teacher. This is due to the fact that there are real limitations to the application of AI within the higher education industry.

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12. Addendum A: Final Research Report Summary Document Table

TITLE: Employee perception of artificial intelligence towards job security in Private Higher Education institutions

Research Purpose/ Objective	Primary Research Question	Research Rationale	Seminal Authors/ Sources	Literature Review – Conceptual Framework	Paradigm	Approach	Data Collection Method(s)	Ethics	Anticipated Findings	References
To explore the perceptions of employees’ that work at a private higher educational institution in terms of the affect artificial intelligence could have on job security.	What are the employee perceptions of artificial intelligence towards job security in private higher education institutions?	This study is important as it looks at the changes occurring in higher education due to the increase in the application of artificial intelligence.	- Carrel and Dittrich - Cosier and Dalton - Du Plooy-Cilliers, Davies and Bezuidenhout - Haugeland - Herzberg, Mausner and Snyderman - Huseman, Hatfield and Miles - Maree	Theme 1: Overview of artificial intelligence in a global context. Theme 2: The link between artificial intelligence and job security. Theme 3: The global perspective of employee perceptions of artificial intelligence on job security.	Paradigm Interpretivism Epistemology This study aims to contribute to the body of existing knowledge. Ontology Reality can be identified and explained as a social construct, based on the dependence of meaning given by humans in relation to their own social interactions and experiences. Axiology There is great value in gaining insight by exploring, interpreting and understanding a phenomenon through research.	Qualitative	The researcher used semi-structured interviews. The researcher asked a number of open-ended questions and followed up through probing. The participants answers were recorded with an audio-recording device.	The researcher would receive written consent, confidentiality and autonomy would be upheld, participation would be voluntary and discriminatory or offensive language would be avoided.	The researcher expects to find that the employee perception of artificial intelligence is that of uncertainty in terms of job security due to the alarming rate at which artificial intelligence is progressing.	- Alpaydin - Altinay, Karaatmaca and Altinay - Bizshift-Trends - Bouchard - Bryan - Du Plooy-Cilliers, Davies and Bezuidenhout - Habib, Awan and Sahibzada - Harris - Haugeland - Herzberg, Mausner and Snyderman - Hoffman-Miller - Katt and Condly - Maree - Miller - Ocaña-Fernández, Valenzuela-Fernández and Garro-Aburto - Popenici and Kerr - Prodan, Maxim, Manolescu, Arustei and Guta - Renz and Hilbig - Zawacki-Richter, Marin, Bond and Gouverneur
Research Problem	Secondary Objectives	Key Concepts	Key Theories					Sampling	Data Analysis Method(s)	Limitations
Little research has been done on the risks associated with the application of AI in higher education on job security.	1. To provide an overview of AI in a global context. 2. To explore the employee perception of AI. 3. To assess how employee perceptions of AI influences job security in higher education. 4. To propose solutions on how higher education institutions can overcome the employee perception of AI.	- Artificial intelligence - Higher education - Machine learning - Teaching - Intelligent tutoring systems - Private higher education institutions - Job security	- Herzberg’s motivator-hygiene theory - Equity theory			Probability or non-probability Non-probability sampling method Sampling method Semi-structured interviews Size 4	Unit of Analysis The individual Data Analysis Method Thematic analysis (qualitative) Hermeneutic analysis (qualitative)	- Small sample size. - Limited time and resources. - Researchers bias. - Lack of accessibility. - The sample utilised does not represent the full population of higher education employees.	The research study aims to contribute to the field of artificial intelligence as there is a lack of research within this environment.	

13. Addendum B: Explanatory Information Sheet

To whom it may concern,

My name is **Dario Borges**, and I am a student at **IIE Varsity College Sandton**. I am currently conducting research under the supervision of **Dr Stellah Lubinga** about **the employee perception of artificial intelligence towards job security in Private Higher Educational institutions**. I hope that this research will enhance our understanding of artificial intelligence as there is a lack of research within this environment.

I would like to invite you to participate in my study. In order to explain to you what your participation in my study will involve, I have formulated questions that I will try to fully answer so that you can make an informed decision about whether or not to participate. If you have any additional questions that you feel are not addressed or explained in this information sheet, please do not hesitate to ask me for more information. Once you have read and understood all the information contained in this sheet and are willing to participate, please complete and sign the consent form below.

What will I be doing if I participate in your study?

I would like to invite you to participate in this research because **you will be contributing to the field of artificial intelligence as there is a lack of research within this environment**. If you decide to participate in this research, I would like to **conduct semi-structured interviews that will be conducted through online zoom calls and will take approximately 15-30 minutes of your time**.

You can decide whether or not to participate in this research. If you decide to participate, you can choose to withdraw at any time or to decide not to answer particular interview questions.

Are there any risks/ or discomforts involved in participating in this study?

Whether or not you decide to participate in this research, there will be no negative impact on you. There are no direct risks or benefits to you if you participate in this study. You might, however, indirectly find that it is helpful to talk about your **perception of artificial intelligence towards job security in Private Higher Educational institutions**.

If you find at any stage that you are not comfortable with the line of questioning, you may withdraw or refrain from participating.

Do I have to participate in the study?

- Your inclusion in this study is completely voluntary;
- If you do not wish to participate in this study, you have every right not to do so;
- Even if you agree to participate in this study, you may withdraw at any time without having to provide an explanation for your decision.

Will my identity be protected?

I promise to protect your identity. I will not use your name in any research summaries to come out of this research and I will also make sure that any other details are disguised so that nobody will be able to identify you. I would like to ask your permission to record the interviews, but only my supervisor, I and possibly a professional transcriber (who will sign a confidentiality agreement) will have access to these recordings. Nobody else, including anybody at **IIE Varsity College Sandton**, will have access to your interview information. I would like to use quotes when I discuss the findings of the research, but I will not use any recognisable information in these quotes that can be linked to you.

What will happen to the information that participants provide?

Once I have finished all interviews, I will write summaries to be included in my research report, which is a requirement to complete my **Bachelor of Commerce Honours in Business Management**. You may ask me to send you a summary of the research if you are interested in the final outcome of the study.

What happens if I have more questions about the study?

Please feel free to contact me or my supervisor should you have any questions or concerns about this research, or if there is anything you need to know before you decide whether or not to participate.

You should not agree to participate unless you are completely comfortable with the procedures followed.

My contact details are as follows:

Dario Borges

The contact details of my supervisor are as follows:

Dr Stellah Lubinga

14. Addendum C: Informed Consent Form

I, _____, agree to participate in the research conducted by **Dario Borges** about **the employee perception of artificial intelligence towards job security in Private Higher Educational institutions.**

This research has been explained to me and I understand what participation in this research will involve. I understand that:

1. I agree to be interviewed for this research.
2. My confidentiality will be ensured. My name and personal details will be kept private.
3. My participation in this research is voluntary and I have the right to withdraw from the research at any time. There will be no repercussions should I choose to withdraw from the research.
4. I may choose not to answer any of the questions that are asked during the research interview.
5. I may be quoted directly when the research is published, but my identity will be protected.

Signature

Date

15. Addendum D: Consent Form for Audio-Recording

I, _____, agree to allow **Dario Borges** to audio record my interviews as part of the research about **the employee perception of artificial intelligence towards job security in Private Higher Education institutions.**

This research has been explained to me and I understand what participation in this research will involve. I understand that:

1. My confidentiality will be ensured. My name and personal details will be kept private.
2. The recordings will be stored in a password protected file on the researcher's computer.
3. Only the researcher, the researcher's supervisor and possibly a transcriber (who will sign a confidentiality agreement) will have access to these recordings.

Signature

Date

16. Addendum E: Interview Guide

Context to be read out to participant:

Between the periods of 2018 and 2022 there is an anticipated growth of AI by 43% in the realm of education. This means that the future of higher education will experience a number of major changes due to the link between the increase in the application of AI and the development of new technologies. Some view this as a solution to existing and future challenges, whereas others view them as a risk to job security.

The purpose of this study is to investigate the employee perception of AI towards job security in private higher education institutions. This research study aims to explore the perception of employees' that work at a private higher educational institution in terms of the affect artificial intelligence could have on job security.

Glossary

Artificial intelligence: For the purpose of this study, AI is an umbrella term that has been used to describe a range of technologies.

Machine learning: For the purpose of this study, machine learning can be identified as a section of computer science that would allow computers to learn new behaviour based on empirical data.

Intelligent tutoring systems (ITS): For the purpose of this study, it is a software tool that can be used in PHEIs.

Job security: For the purpose of this study, job security refers to the risk associated with AI on PHEIs. For example, the introduction of ITS.

Private higher education institutions (PHEIs): For the purpose of this study, PHEIs is the area of focus when it comes to the application of AI technologies.

Questions

1. Please specify your gender:
2. Please Specify your age:
3. Please indicate your years of experience in this position:
4. How would you describe artificial intelligence?
5. Which one of the following comes to mind when you think of artificial intelligence?

6. Would you say artificial intelligence is the future of higher education? Please elaborate on your answer
7. What do you think are the advantages of using artificial intelligence in higher education?
8. What do you think are the disadvantages of using artificial intelligence in higher education?
9. On a scale of 1-5, how would you rate the following statements with regards to artificial intelligence and job security?
10. Do you think there is a link between artificial intelligence and job security in higher education?
11. What is your perception of artificial intelligence towards job security in higher education?
12. What do you think higher education institutions can do to overcome the employee perception of artificial intelligence towards job security?

Thank you for taking part in this interview process. In doing so, you have contributed to the body of knowledge with regards to the field of business management. Please do not hesitate to contact me if you have any questions or queries that relate to the research topic and have a great day further.

17. Addendum F: Ethics Clearance Letter



24 July 2020

Student Name: Dario Borges

Student Number: 14007326

Campus: IIE's Varsity College

Re: Approval of Bachelor of Commerce Proposal and Ethics Clearance

Honours Ethical Clearance Letter

Your research proposal and the ethical implications of your proposed research topic were reviewed by your supervisor and the campus research panel, a subcommittee of The Independent Institute of Education's Research and Postgraduate Studies Committee.

Your research proposal posed no significant ethical concerns, and your supporting documents and instruments are in order to proceed. We hereby provide you with permission to proceed with your research.

In the event of you deciding to change your research methodology in any way, kindly consult your supervisor to ensure all ethical considerations are adhered to and pose no risk to any participant or party involved. A revised ethical clearance letter will be issued.

We wish you all the best with your research!

General Conditions to be Fulfilled in Relation to Research:

Permission is granted to proceed with the above study subject to the conditions listed below being met and may be withdrawn should any of these conditions be flouted.

Please note: The panel has not considered the merits, accuracy or ethical soundness of the research. The only merits examined are the use of The IIE as a sample.

Permission is granted subject to the following conditions:

1. The researcher(s) will need to obtain informed consent in writing from all of the participants in his/ her sample if the study is not anonymous.
2. The researcher(s) may only use the data collected for research purposes and in no other way.
3. Photographs of human subjects may only be taken if relevant to the research, informed consent was obtained, and even with informed consent, the photographs may not be published on any online platforms.
4. The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.
5. No names or identifying information of participants may be used within the research and the research must be voluntary.
6. Please make it clear that the information will not be used punitively in any way and participants may in no way be counselled/advised based on this.

Supervisor:

Dr Stellah Lubinga

Campus Postgraduate Coordinator (CPC):

Jenna-Lee Ramnarain