

**Exploring the perceptions of the use of
different modes of psychometric assessment
by industrial psychology professionals**

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Mini-dissertation accepted in partial fulfilment of the
requirements for the degree [Master of Commerce](#) in
[Industrial and Organisational Psychology](#) at North-West
University

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Graduation: June 2021

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FOR THE READER'S ATTENTION

The reader is reminded of the following:

- This mini-dissertation was submitted in the form of a research article. This mini-dissertation consists of three chapters. Chapter 1 is an introduction, Chapter 2 contains the research article and in Chapter 3, the conclusions, limitations and recommendations are discussed.
- The compilation of the mini-dissertation was completed following the guidelines prescribed by the School of Industrial Psychology and Human Resource Management at the North-West University (Potchefstroom Campus). The referencing guidelines of the Publication Manual (7th ed.) of the American Psychological Association (APA) were followed.
- Each chapter of this mini-dissertation has its own reference list.

ACKNOWLEDGEMENTS

I would like to extend my sincerest gratitude and appreciation to the following individuals, without whom this research would not have been possible:

- I would like to thank my Heavenly Father for providing me with countless opportunities, grace and the strength to endure.
- A special thanks to my remarkable Supervisor, Dr Lizelle Rossouw, you have been role model for me since my first year of studies. I would like to thank you for your encouragement, guidance, and for always making time for me to complete this project. I feel honoured that you could be my Supervisor and I truly appreciate your support in this journey.
- I would also like to thank to my parents, brother and grandmother: Mattheus Maritz, Lynda Maritz, Ruan Maritz, and Johanna Maritz. I cannot thank you enough for the opportunity to complete my studies and for all your financial and emotional support.
- My fiancé, Carel Roberts, thank you for 6 years of endless encouragement and motivation throughout my studies.
- All my friends and fellow Master's students, who supported me in many ways. A special thanks goes to Arné Grobbelaar, Adèle Kapp and Ingé-Ame Schoeman - this journey wouldn't have been near as much fun and filled with memories without you.
- My friends, Francois Lombard and Elzani Lombard, for your support and encouragement to complete my dissertation whilst completing my internship and even after that.
- I would like to express my sincere gratitude to all the research participants who agreed to share their experiences and opinions with me.
- My language editor, Cecilia van der Walt, for your professionalism and all your time and effort spent on the language and technical editing of my dissertation.

DECLARATION BY RESEARCHER

I, Lyné Maritz, hereby declare that ‘Exploring the perceptions of the use of different modes of psychometric assessment by industrial psychology professionals’ is my own work and that the views and opinions expressed in this study are those of the author and relevant literature references as shown in the references.

I further declare that the content of this research will not be submitted for any other qualification at any other tertiary institution.

A handwritten signature in dark ink, appearing to read 'Lyné Maritz', enclosed within a light blue rectangular box.

Lyné Maritz

March 2021

DECLARATION BY LANGUAGE EDITOR



16 March 2021

I **Ms Cecilia van der Walt** hereby declare that I took care of the **editing** of the **dissertation of Ms Lyné Maritz** titled *Exploring the perceptions of the use of different modes of psychometric assessment by industrial psychology professionals.*

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SUMMARY

Title: Exploring the perceptions of the use of different modes of psychometric assessment by industrial psychology professionals.

Key words: Psychometric assessments, computerised assessments, paper-and-pencil assessments, gamified assessment, Industrial Psychologists, Psychometrists

Psychometric assessment is a sub-discipline in Industrial Psychology, and it plays an integral role in decision-making processes on an individual, group and organisational level. Due to technological advances, the assessment arena has evolved, and over the years many developments have come into being. Not only has the fourth Industrial revolution accelerated the speed at which these advancements are applied in the field of Industrial Psychology; the COVID-19 pandemic and world-wide lockdown has also affected the manner in which assessments are administered. This means that Industrial Psychology professionals need to be agile and keep the pace to ensure that high-quality standards in assessments are still achieved in this digital age. Psychometric assessments can be administered in different assessment modes (i.e. paper-and-pencil assessments, computerised assessments and gamified assessments). Multiple considerations and factors are associated with each assessment mode, especially when applied in the context of South Africa, which is known for its rich diversity.

The objective of this study was to explore and describe the perceptions of Industrial Psychology professionals with regard to the use of the different modes of psychometric assessments in the digital age. A qualitative research design was employed in this study based on an interpretivist paradigm. A combination of purposive and snowball sampling techniques was used for data-collection purposes. Data were gathered from Industrial Psychology professionals working either in private practice or in an organisation ($N=21$). The data were collected by using written qualitative surveys via the *QuestionPro* platform. The researcher employed a thematic analysis for analysing the data.

The results indicated that all participants prefer using different psychometric assessment modes for various reasons and purposes such as recruitment and selection, development, career guidance, medico-legal assessments etc. Most participants indicated that they prefer to

use computerised assessments. Only the minority of the participants mentioned that they use gamified assessments; it is new to the market, and Industrial Psychology professionals require more knowledge of this assessment mode. The results of this study also highlighted the potential benefits and challenges associated with paper-and-pencil, computerised and gamified assessments as perceived by Industrial Psychology professionals working in their own practices or in organisations. Recommendations were also made for future research and practice. Some of the recommendations made by Industrial Psychology professionals are made to psychometric assessment test publishers and higher education institutions.

OPSOMMING

Titel: 'n Onderzoek na die ervaring van kundiges op die gebied van Bedryfsielkunde rakende die gebruik van verskillende modusse van psigometriese toetse.

Sleutelwoorde: Psigometriese toetse, gerekenariseerde toetse, papier-en-potlood toetse, speletjiegebaseerde toetse, Bedryfsielkundiges, Psigometriste

Psigometriese toetsing is 'n sub-dissipline in Bedryfsielkunde en dit speel 'n belangrike rol in besluitnemingsprosesse op 'n individuele, groep- en organisatoriese vlak. Weens tegnologiese vooruitgang het die assesseringsarena uitgebrei, en oor die jare heen het talle ontwikkelinge plaasgevind. Die spoed waarteen hierdie vooruitgang plaasvind, het nie alleen versnel as gevolg van die vierde industriële rewolusie nie; die COVID-19 pandemie en wêreldwye grendeltydperk het 'n merkwaardige versnelling teweeggebring. Dit beteken dat kundiges op die gebied van Bedryfsielkunde aanpasbaar moet wees en op hoogte moet bly om te verseker dat standarde gehandhaaf word, veral in hierdie digitale era.

Psigometriese toetse kan op verskillende wyses afgeneem word (bv. papier-en-potlood metode, gerekenariseerde metode en speletjiegebaseerde toetse). 'n Reeks faktore gaan gepaard met elke toetsmetode wat in ag geneem moet word, veral wanneer hierdie metodes gebruik word op kandidate wat afkomstig is uit Suid-Afrika wat bekend is vir sy ryk diversiteit.

Die doel van hierdie navorsingstudie was om die persepsies van kundiges op die gebied van Bedryfsielkunde rakende die gebruik van die verskillende modusse van psigometriese toetse in die digitale era te ondersoek en te beskryf. 'n Kwalitatiewe navorsingsontwerp is in die studie gebruik, gebaseer op die interpretivistiese paradigma. 'n Kombinasie van doelbewuste en sneeubal-steekproefneming-tegnieke was aangewend om data in te samel. Kundiges op die gebied van Bedryfsielkunde wat in óf privaat-praktyke óf ondernemings werk, het deel uitgemaak van die steekproef ($N=21$). Data is met behulp van die QuestionPro-platform ingesamel aan die hand van geskrewe kwalitatiewe vraelyste. Die navorser het tematiese analiese gebruik om die ingesamelde data te analiseer.

Die resultate van hierdie studie het aangetoon dat alle deelnemers verskies om verskillende metodes van psigometriese toetse te gebruik vir verskeie redes en doeleindes. Die deelnemers het aangedui dat hulle psigometriese toetse gebruik, onder andere vir indiensneming, ontwikkeling, loopbaan-voorligting, werknemer-welstand ens. Die oorgrote meerderheid van die deelnemers het aangedui dat hulle gerekenariseerde psigometriese toetsing verkies. Die minderheid van die deelnemers het genoem dat hulle speletjie-gebaseerde toetsing gebruik; dit is nuut op die mark, en kundiges op die gebied van Bedryfsielkunde meer kennis daarvan moet opdoen. Die resultate het verder die moontlike voor- en nadele aangetoon wat met papier-en-potlood, gerekenariseerde en speletjiegebaseerde psigometriese toetse gepaard gaan, soos kundiges op die gebied van Bedryfsielkunde óf in hul eie praktyke óf in ondernemings dit ervaar. Die deelnemers het verder aanbevelings gemaak ter verbetering van die gebruik van psigometriese toetse. Sommige deelnemers se aanbevelings was spesifiek gemaak vir psigometriese asseseringstoets-uitgewers en hoëropvoeding-instansies.

Die navorser het ook aanbevelings gemaak vir toekomstige navorsing en die praktyk.

CHAPTER 1

INTRODUCTION

INTRODUCTION

This study focused on exploring the perceptions of Industrial Psychology professionals regarding the use of different modes of psychometric assessments in the digital age. In Chapter 1 the problem statement, research objectives, research approach and research design are discussed. A chapter summary is included.

1.1 Problem statement

The workplace is increasingly challenged to keep up with the rapid pace of technological change, which the fourth industrial revolution brings and the impact it subsequently has on work practices and the manner in which work is performed (Ghislieri et al., 2018). The fourth industrial revolution is characterised by digitalisation, automation and artificial intelligence, which holds the potential of impacting an organisation to such an extent that the idea of what a job is, needs to be redefined (Holbeche, 2017). Xu et al. (2018) refer to the fourth industrial revolution as the digital revolution and suggest that a remarkable aspect thereof is the extremely rapid pace at which technology is changing. Manyika (2017) suggested that technology is a key driver of change in any workplace and digitalisation affects all areas of work.

Technological change forces organisations to revise their human capital strategies as the employees and the organisation have to be re-invented to remain competitive. This implies that the Industrial Psychologist will play an important role in facilitating this change (Bersin et al., 2017). Morelli et al. (2017) mentioned that all areas in Industrial Psychology are indeed affected by technology and further research should be directed at what the exact impact thereof is. One area influenced by technological changes and which has evolved over a period of time is psychometric assessments. However, not only has the fourth industrial revolution brought about change, the COVID-19 pandemic and world-wide lockdown has further transformed the assessment landscape at a rapid pace. Industrial Psychology professionals were forced to adapt to digital solutions in order to comply with COVID-19 regulations (Reid & Sam, 2020).

Psychometric assessment plays a vital role in the field of Industrial Psychology. However, it should be perceived as an application area which supports activities in Industrial Psychology (Bergh, 2017). It is not only Industrial Psychologists that utilise psychometric assessments, also Psychometrists do, and for the purposes of this study these individuals will be referred to as Industrial Psychology professionals. Psychometric assessments serve as a tool which aids Industrial Psychologists in trying to understand and describe the workforce by obtaining samples of employees' behaviour which enables them to make critical decisions in an organisation (Coetzee & Schreuder, 2010). Wolf (2016) found that the use of psychometric assessments is increasing due to the professionalisation of the Human Resources profession and the increase was further attributed to legal and regulatory factors, as assessments are used as a defensive measure which enables organisations to justify fair and objective selection practices.

Psychometric assessments can be defined as 'the scientific use of psychological tests and other techniques for specific purposes to obtain relevant information on people's behaviour in order to understand and explain their behaviour, to solve specific problems or make decisions' (Bergh, 2017, p. 393). Bergh (2017) further proposed that psychometric assessments can be applied in multiple areas of the organisation for specific purposes such as employee selection and development, for training purposes, in determining employee potential and lastly in identifying behaviour which can cause potential problems in the organisation.

Sehrawat and Sehrawat (2017) maintain that psychometric assessments can be a powerful instrument to use in the decision-making process of acquiring talent. Van der Merwe (2002) suggested that psychometric assessments should be included in the selection of both prospective and current employees to improve the selection process and it should further be utilised for employee development purposes as this is a major challenge in South Africa. However, it is important to use the correct assessment in each particular business context so as to gain maximum value from it. Coetzee and Schreuder (2013) suggested that a psychometric approach should be used in organisations to maximize accuracy and objectivity when making predictions regarding employees' future work performance. Schreuder (2013) proposed that this approach should include psychometric assessments and performance-based or work-simulation methods used in the selection context.

Bergh (2017) proposed that various constructs which contribute to the effectiveness of an employee can be measured by making use of psychometric assessments. These constructs are cognition, intelligence, personality, values, affective behaviour or emotional states, interests and job knowledge or skills. Sehrawat and Sehrawat (2017) suggested that the constructs to be measured should ultimately contribute to the organisation's effectiveness to make the desired impact. Thus, it enables Industrial Psychology professionals to obtain a clear image of an employee's functioning and the position in the organisation in which these individuals will perform best.

In the current digital age psychometric testing is delivered in various modes such as computerised testing, online assessments and also gamification. However, the option of paper-and-pencil-based assessment is still widely used by Industrial Psychology professionals today. Each format of assessment holds advantages as well as disadvantages. A discussion on computerised assessments, gamification and paper-and-pencil-based assessments will follow next.

Computer technology made it possible for psychometric assessments to be transformed from paper-based assessments to delivering it in the form of digital assessments (Davies et al., 2013). Davies et al. (2013) defined computerised assessments as psychometric assessments which are administered by means of a computer and the results are further scored and reports processed by using a computer. This is done by reproducing paper-and-pencil-based assessments in the form of an online version. Computerised assessments can be administered in different ways. The person being assessed can complete the online assessment in the comfort of his or her own home, which means that there are limited to no in-person interaction between the Industrial Psychology professional and the person being assessed (Chuah et al., 2006). In this case the assessor would send an online link to the test-takers and brief them about the process, but the test-taker has to follow the computer's instructions by him or herself. This can be referred to as the controlled mode (Foxcroft & Roodt, 2018). An alternative is that the person being assessed completes the computerised assessment under the supervision of the Industrial Psychology professional and the instructions of the assessment are worked through with the client to make sure he or she has a clear understanding of how to complete the assessment. Foxcroft and Roodt (2018) refer to this as the supervised mode. In the case where problems arise during the assessment, the professional will be able to take care of the issue. By following this approach, the Industrial Psychology professional can also

obtain further qualitative information by interacting and communicating with the person being assessed. Psytech International (2010) suggests that 'it is not possible to automate responsible professional behaviour' (p. 3); therefore, regardless of the administration mode, it is still imperative to establish a professional relationship with the person being assessed and it is not advisable to have no in-person interaction with the test-taker, as the Industrial Psychology professional will not be able to make behavioural observations which contributes to the results of the test-taker.

There are various implications which computerised or online assessments can have on the administration, scoring and reporting thereof. Buchanan (2002) proposed that 'given that these tools are useful when assessments are carried out in traditional settings, it is likely that they will also be useful when assessments are carried out through various technological media' (p. 148). An extremely important consideration in the use of computerised assessment is that although a different medium is used to administer, score and report assessment data the same principles and standards should apply. Computerised testing introduced new ways of assessing, which means that the administering, scoring, interpreting and reporting differs from the traditional paper-and-pencil-based assessments. Computer-based test interpretation systems (CBTI) are used to aid the registered professional in interpreting psychometric assessment scores (Foxcroft & Roodt, 2018). It allows the professional to choose appropriate norms before generating a report. However, it is important that these systems should also be proved to be valid and reliable and the registered professional's judgement should not be disregarded in this process; the CBTI report should merely be used as a guideline for interpretation (Foxcroft & Roodt, 2018).

Research has shown that positives and negatives alike can be drawn from computerised or digitalised assessment, challenges will inevitably arise, but these challenges need to be taken into account when using such types of assessment. A great amount of attention is being given to the issue of measurement equivalence. According to Buchanan (2002) equivalence between the paper-and-pencil and computerised version of an assessment cannot be assumed. The problem regarding non-equivalence occurs when paper-and-pencil-based assessments are adapted and transformed into computerised versions of those assessments and it does not measure in the same way (Joubert & Kriek, 2009). In addition to that, Weir (2018) suggests that professionals should only use digital assessments which are proven to be valid and reliable as there are various assessments available that are not proved to be valid and reliable

(Joubert & Kriek, 2009). A further challenge is computer literacy and access to computers, which also becomes a factor that could impact the use of computerised assessment as some people might have limited or no access to technology and this would place them at a disadvantage (Naus et al., 2009). Foxcroft and Roodt (2018) proposed various challenges regarding computerised and online assessments such as a lack of cyber security, confirming the true identity of the person being assessed, confidentiality issues, connectivity disturbances, human-computer interface issues such as computer anxiety and added to this, computerised assessment tools are expensive to use or purchase.

As opposed to this, digital assessment has loads of potential and can be viewed as a benefit. Chuah et al. (2006) suggests that the use of internet-delivered assessments holds multiple benefits for both the assessor and the person being assessed, the main advantage would be the convenience of assessments which could be administered in any location at any given time. Foxcroft and Roodt (2018) proposed further advantages such as efficiency of scoring, as the scores of an assessment can be processed immediately. This means that it reduces the lead time of delivering reports to clients. Computerised assessments has the capacity to aid persons with disabilities who have to complete assessments, since voice-activated and enlarged digital assessments can be used, and time keeping can be eliminated, which means that the Industrial Psychology professionals can focus on the quality of administration of assessments, and computerised assessments require less labour due to the fact that registered professionals are able to generate computerised reports which they can use to integrate it into their final report to the client (Foxcroft & Roodt, 2018).

Gamified assessments are becoming increasingly relevant in the assessment sphere and can be contributed to digital technology which provided assessment with new concepts and trends in measurement tools. Gamification is used in the work context to assess candidates' competencies when applying for a job (Weir, 2019). Gamification is a concept which is used in employee selection assessment to assess candidates in order to predict their behaviour. Cut-e Group (2019) defines gamification as 'a proven psychometric assessment that has been enhanced with game-style elements to make it more engaging for candidates' (p. 3). Distiller (2019) suggests that common characteristics of gamification in a psychometric context are elements such as levels, badges, points, sounds, progress boards, leader boards, and virtual goods etc. which are used to elicit actions from the test-takers. Armstrong et al. (2016) suggest that the use of gamification has the potential to enhance the assessment process by

obtaining more valuable information from gamification than from traditional assessments, as respondents will not be able to fake or manipulate performance. Distiller (2019) explains that gamified assessments enhances both the candidate and employer experience as the reason for gamifying psychometric assessments is to obtain a higher level of candidate engagement, enabling employers to make better informed decisions. A further advantage is that certain behaviour can be triggered through gamification. Gamification makes it possible for Industrial Psychology professionals to measure psychological constructs by limiting the social desirability of the results as it assesses gameplay-behaviour and it is not self-report (Armstrong et al., 2016). Krasulak (2016) maintains that gamification is not only useful in the process of selecting the most suitable candidate for a job according to certain competencies, but that it can also serve as a tool which can be used in employee development. This means that the selected candidate will be developed through gamification, building on the newly appointed employee's strengths and addressing possible weaknesses. Krasulak (2016) further suggested that the use of the concept *gamification* will increase given the generation who are now entering the workforce and will soon be the majority of the workforce.

However, regardless of the numerous advantages of computerised, online and gamified psychometric assessments, Industrial Psychology professionals might still prefer making use of paper-and-pencil assessments. Paper-and-pencil assessments are the traditional form of offering psychometric assessments and the administering of the assessments involve test booklets and answer sheets which the test takers use to complete the assessment (Hinton & Stevens-Gill, 2016). The scoring of paper-and-pencil assessments is done by using scoring masks or stencils, and the reports are compiled by the registered user. This is a time-consuming process (Naglieri et al., 2004).

Paper-and-pencil modes of assessment hold benefits and drawbacks alike. Some benefits coupled with the utilisation of paper-and-pencil psychometric assessments are that the Industrial Psychology professional is able to establish rapport with test-takers, suggesting that the interaction with the test-takers can be useful in aiding the report writer to validate self-report results. This can be referred to as qualitative information that is gathered concerning the test-taker's behaviour (Foxcroft & Roodt, 2013). A further advantage is that the costs involved in administering paper-and-pencil assessments are far more affordable than computerised assessments and paper-and-pencil psychometric assessments can moreover be used in instances where socio-cultural and linguistic factors play a role in the test-taker's

ability to use computers, as it may largely impact their test performance, which raises issues such as fairness (Foxcroft & Roodt, 2013).

On the other hand, drawbacks associated with paper-and-pencil assessments include the security of test material and results that gets lost (Foxcroft & Roodt, 2013). Test-takers are not able to be flexible around taking the assessments as they are bound to a certain location and time to complete paper-and-pencil assessments (Barak & Buchanan, 2003). A further drawback is the scoring of paper-based assessments which is time consuming as it is manually scored, this also means that human errors can easily be made, and this method is usually associated with the use of outdated norms which affect the test results as it cannot be updated automatically as can be done with computerised or online assessments (Barak & Buchanan, 2003). To this date paper-and-pencil assessments are still used by Industrial Psychology professionals. According to Foxcroft and Roodt (2018) paper-and-pencil assessments remains relevant and will still be used given that there are many cases in which one would rather use paper-and-pencil-based assessments and other formats of assessment, for example in the case of difficulties with power, the non-availability of computers and other digital resources, and in the case where the test taker is not computer-literate. However, Foxcroft and Roodt (2018) describe the traditional paper-and-pencil assessments as ‘the exception rather than the default’ (p. 255). This is an indication that paper-and-pencil psychometric assessments are in fact still used; however only in certain circumstances and contexts. Bergh (2017) also suggested that paper-and-pencil modes of psychometric assessment are still widely used, seeing that access to IT and internet remains a limitation for many people in South Africa. A study conducted by SHL indicated that 41-percent of respondents in the Middle East and Africa region used paper-and-pencil-based assessments to make talent decisions. These also are the regions in which paper-and-pencil assessments were mostly used, compared to other regions such as America, Asia, Australia, New Zealand and Europe (Kantrowitz et al., 2018). Hence, it is evident that paper-and-pencil psychometric assessments are still used in certain contexts and should not be totally dismissed.

Digitalisation expects Industrial Psychology professionals to lean towards computerised and gamified assessment, but there are still professionals using paper-and-pencil assessments, thus it should not be disregarded. Research on psychometric assessment is important and this is supported by the recent launch of the African Journal of Psychometric Assessment (AJOPA). Research has been done on computerised-, gamified- and paper-and-pencil

psychometric assessments. However, no research has been conducted on the different modes of psychometric assessments which Industrial Psychology professionals prefer to use in practice and the implications thereof. Thus, a gap exists in literature with regard to gaining insight into the utilisation of the different modes and the most preferred mode of assessment. The use of different modes of assessment and the implications thereof should be taken into account as assessments are used to make critical decisions within organisations. By conducting this study, professionals within the field of Industrial Psychology will be informed about the benefits but also the pitfalls and challenges associated with the different modes of assessment. In addition, this study will influence the way in which organisations draft and implement assessment policies, as the utilisation of the different modes of psychometric assessments will need to be addressed in assessment policies seeing that it may have many implications.

1.2 Research Questions

- How are paper-and-pencil–, computerised–, and gamified psychometric assessments conceptualised according to literature?
- What are the purposes for which Industrial Psychology professionals use the different modes of psychometric assessments?
- What modes of psychometric assessments do Industrial Psychology professionals use?
- What are the potential benefits associated with the use of different modes of psychometric assessments?
- What are the potential challenges associated with the use of different modes of psychometric assessments?
- What recommendations can be made by Industrial Psychology professionals to enhance the use of psychometric assessment?
- What recommendations can be made for future research and practice?

1.3 Expected contribution of the study

For the individual

This study will create awareness and advance Industrial Psychology professionals' knowledge on the different modes of psychometric assessment as this will influence their decisions on selecting the most suitable mode of psychometric assessments for their specific needs. It will encourage individuals to re-think the way in which they conduct psychometric assessments by taking different factors into consideration.

For the organisation

The significant contribution for the organisation is to show the implications the different modes of assessment can have in terms of administering, scoring and interpreting assessments. Organisations will gain more information to consider the benefits and challenges of the different modes of assessment. In addition, this study will ultimately inform the way in which assessment policies are drafted and implemented in the organisation.

For literature

This study will provide Industrial Psychology literature with qualitative answers to understand why and in what instances Industrial Psychology professionals choose to use certain modes of assessments. It will also provide literature with insights to indicate the gaps that technology can fill or omit in the assessment sphere.

1.4 Research objectives

The research objectives were divided into a general objective and specific objectives.

1.4.1 General objective

The general objective of this study was to explore and describe the perceptions of Industrial Psychology professionals with regards to the use of the different modes of psychometric assessments in the digital age.

1.4.2 Specific objectives

- To conceptualise paper-and-pencil–, computerised– and gamified psychometric assessments according to literature.
- To explore the purposes for which Industrial Psychology professionals use the different modes of psychometric assessment.
- To explore the different modes of psychometric assessments used by Industrial Psychology professionals.
- To explore the potential benefits associated with the use of different modes of psychometric assessments.
- To explore the potential challenges associated with the use of different modes of psychometric assessments.
- To explore recommendations made by Industrial Psychology professionals to enhance the use of psychometric assessment.
- To make recommendations for future research and practice.

1.5 Research design

1.5.1 Research approach

In this research study a qualitative research approach was employed as the nature of the research study was explorative and qualitative data was used. Hammarberg et al. (2015) mentioned that ‘qualitative methods are used to answer questions about experience, meaning and perspective of participants’ (p.499). Therefore, a qualitative research design was the most suitable to use in this study as the focus was placed on understanding and interpreting the research participant’s viewpoint. Seeing that this research study was aimed at gaining a better understanding of Industrial Psychology professionals’ viewpoint, a qualitative approach was considered the most suitable approach. Wiley et al. (2011) suggests that a qualitative approach should be led by an emphasis on understanding the perspectives of individuals who are directly influenced by the phenomena being studied.

In this study the interpretivist paradigm was used, given that the researcher focused on understanding the research participants' experiences. An interpretive paradigm aims to comprehend the subjective world of individuals' experiences (Cohen et al., 2011). The use of the interpretivist paradigm was relevant in this study as Industrial Psychology professionals are all exposed to the same phenomena (i.e. psychometric assessment), but the way in which it is experienced and interpreted may differ and in this case the researcher aimed to explore the different interpretations.

1.5.2 Research strategy

A qualitative descriptive strategy was used in this study. This strategy was utilised to empirically investigate the research participant's perceptions and experiences of a certain phenomenon that occurs within the world (Neergaard et al., 2009). Nassaji (2015) contends that descriptive research is aimed at unfolding and defining a phenomenon and its characteristics. Wiley et al. (2011) suggests that employing a descriptive strategy allows the researcher to record noticeable features of the phenomenon under study such as the processes, attitudes and beliefs. It was suitable to use a qualitative descriptive strategy in this study as the aim was to understand and determine the perceptions of Industrial Psychology professionals associated with the use of different modes of psychometric assessments (i.e. phenomenon under study).

1.6 Research method

The research method comprised of a literature review, research setting, entrée and establishing researcher roles, sampling, data collection methods, recording of data, data analysis, strategies employed to ensure quality data, reporting, and ethical considerations.

1.6.1 Literature review

In this research study an extensive literature review was conducted pertaining to the different modes of psychometric assessments such as paper-and-pencil-, computerised- and gamified assessments. Key words used to conduct this literature search included: psychometric

assessments, computerised psychometric assessments, paper-and-pencil psychometric assessments, gamified psychometric assessment, Industrial Psychologists, Psychometrists. Information on these various topics in assessment was obtained by consulting the following sources: Accredited journals such as *South African Journal of Industrial Psychology*, *European Journal of Psychological Assessment*, and *The African Journal of Psychological Assessment*. Databases such as EbscoHost, Emerald, ScienceDirect, Google Scholar and SAE Publications were used. Other sources which were consulted were published books relating to the topic that were acquired from the Library services of North West University.

1.6.2 Research setting

In this research study the researcher approached Industrial Psychology professionals (i.e. registered Industrial Psychologists and Psychometrists) who are self-employed and in private practice. The researcher sent all the participants an email requesting them to complete a qualitative survey via *QuestionPro* (i.e. online survey platform). This method is also known as written online interviews and it took the research participants approximately 30 minutes to complete the survey. The utilisation of this method meant that there was no definite research setting, but research participants were able to answer the interview questions in their own time and at any location that suited them.

1.6.3 Entrée and establishing researcher roles

The researcher commenced with this study after the Economics and Management Sciences Research Ethics committee (EMS-REC) had granted permission for this study to be conducted. The researcher visited the website of the Health Professions Council of South Africa (HPCSA) to identify registered Industrial Psychology professionals (i.e. Industrial Psychologists and Psychometrists) within the Gauteng and North-West provinces. The names of these registered professionals were freely available on the website. Thereafter the researcher gathered the contact details of prospective participants to explain the purpose of the study and to request their voluntary participation. The researcher then emailed the interested participants, providing them with a direct link to the qualitative survey. The researcher also requested participants to provide her with the contact details of other

registered Industrial Psychology professionals within private practice. These prospective participants were contacted in order to request their voluntary participation in this study.

The researcher fulfilled various roles throughout the research study. At first, the researcher fulfilled the role of a planner or co-ordinator, focusing on planning the collection of data and the various formalities required in the data collection phase. The researcher then planned and designed the qualitative survey which was done via the online platform *QuestionPro*. The researcher collected the data by accessing it on the online platform. After the data collection, the researcher's role proceeded to that of a data analyst where the data was analysed in accordance with different categories, themes and sub-themes, where applicable. Lastly, the role of a report writer was fulfilled. In that phase the analysed data was interpreted, and the results were formulated and described. Throughout this research study, neutrality and/or objectivity formed an integral part of the study and was borne in mind during all the phases.

1.6.4 Research participants and sampling

For purposes of this study purposive sampling in the form of expert sampling was used. Snowball sampling was also used to collect data for this study. Expert Sampling is used when the researcher collects data from individuals who are experts or have expert knowledge of a specific study area (Etikan & Bala, 2017). In this study the participants have knowledge of the use of psychometric assessments. Furthermore, purposive sampling (i.e. expert sampling) allows the researcher to collect data that is rich in information, as the research participant is seen to be an expert on a certain phenomenon in the field of the study and the research participant is sensibly selected by making use of certain criteria (Palinkas et al., 2015). In this case the inclusion criteria were the following: 1) participants had to be registered Industrial Psychologists or Psychometrists (i.e. Industrial Psychology professionals); 2) Participants had to have experience with conducting psychometric assessments within their practice; 3) participants had to be proficient in at least English; and 4) participants had to be able and willing to complete a qualitative survey (i.e. written online interview). The utilisation of snowball sampling infers that the researcher asks participants for the details of similar people who will be willing to participate in the study and provide the researcher with appropriate information (Struwig & Stead, 2013). Thus the researcher first identified a suitable participant through expert sampling and asked the participant for other Industrial Psychology

professionals' contact details. The sample comprised ($N=21$) Industrial Psychology professionals. Sampling was governed by data saturation. Fusch and Ness (2015) suggested that with data saturation, a one size fits all approach cannot be taken and it largely depends on the researcher.

1.6.5 Data collection method

Data for this study were collected by making use of a qualitative survey also known as a written online interview. This method takes the form of a survey or questionnaire which research participants have to fill out online; thus the researcher is not present while the research participant is completing the questionnaire (Sowa et al., 2015). The data collection process involved the researcher emailing registered Industrial Psychology professionals. The email included a link that navigated the research participants to an online qualitative survey. After opening the link, the research participants were provided with information indicating the objective of the study. Participants were also informed that their participation is voluntary and that they could withdraw from the process at any given time. The participants were further informed that their personal identities and those of their practice will be protected and that the information obtained will only be used for research purposes. Foxcroft and Roodt (2018) suggest that it is of utmost importance for the researcher to gain informed consent from the research participant to participate in the research study. In this case the research participants were required to give consent on the online platform. After having read the informed consent information, the participants were requested to complete a list of fill-in questions as well as a demographic profile. The demographic profile was merely utilised to describe the study population and was not used to compare groups or draw inferences from the data.

The following questions were included in the online survey:

- 1) Please explain the purposes for which these psychometric assessments are being used within your practice. Please provide a detailed answer.
- 2) There are different modes of psychometric assessment namely paper-and-pencil, computer-based and gamified psychometric assessment. Which modes of

psychometric assessments do you use within your practice? Please provide reasons for your answer.

- 3) Do you prefer using, paper-and-pencil–, computerised–, or gamified psychometric assessments within your practice? Please provide explanations for your answer.
- 4) Taking into consideration the modes of psychometric assessment that you use within your practice, what are the benefits of using each of these modes of psychometric assessment? Please provide a detailed answer.
- 5) Taking into consideration the modes of psychometric assessments that you use within your practice, what are the challenges of using each of these modes of psychometric assessment? Please provide a detailed answer.
- 6) What recommendations would you make to enhance the use of psychometric assessments? Please provide a detailed answer.

1.6.6 Recording of data

De Vos et al. (2011) suggested that the quality of the data obtained is dependent on how one manages and records it. The data obtained from the qualitative survey was automatically saved on the online platform. These collected data were transferred to a Microsoft Excel sheet for further analysis. The Excel sheet was password protected and was stored on a password protected computer to ensure the safety of the data. Data accuracy and storage plays a huge role in the success of the research study and therefore it was implemented throughout the research process. Hence only the researcher and her supervisor had access to the information used in the study. The data were stored and will be kept safe for five years. Thereafter the data will be deleted from both the researcher and the supervisor's computers.

1.6.7 Data analysis

In this study thematic analysis was employed to analyse the collected data. Braun and Clarke (2006) suggested that 'the process starts when the analyst begins to notice, and look for, patterns of meaning and issues of potential interest in data' (p.86). Thematic analysis allowed the researcher to identify themes in the data with a view to formulate interpretations. The following steps of thematic analysis were employed for this research study, as described by Braun and Clarke (2006):

Phase 1: Familiarising oneself with the data

This step involved reading through the data numerous times to become familiar with the data set. The researcher also made notes during this stage to initiate the thought process. Although this process was time consuming, it was a vital step and was done thoroughly as it had an influence on the effectiveness of the coding process.

Phase 2: Generating initial codes

This phase involved categorising the data set and distinguishing between different categories in which the data could be grouped. This was done by identifying patterns in the data set which could form the basis of the themes.

Phase 3: Searching for themes

After the codes had been categorised, the researcher refined, sorted and combined the codes into different themes and sub-themes, where applicable to do so.

Phase 4: Reviewing themes

This phase involved considering the themes once again and ensuring that the themes were clearly distinguishable from one another. During this phase it was important to ensure that the themes form a comprehensible pattern.

Phase 5: Defining and naming themes

During this phase all themes were considered, and themes named appropriately in order to reflect the content thereof.

Phase 6: Producing the report

This phase was only entered when the themes were finalised. This phase involved writing up the data and presenting it in the form of a narrative and in a way that can easily be understood by the reader.

1.6.8 Strategies employed to ensure data quality and integrity

In this study the researcher aimed to employ the following strategies as proposed by Guba (1981) and Anney (2015) to ensure quality data is used and to direct the trustworthiness of the study:

Credibility

This refers to the accuracy in which the topic under study is described, in other words: Does the study measure what it is supposed to measure? There are different ways in which the credibility of a study can be enhanced. In this study credibility was enhanced by establishing structural coherence, which means that the researcher looks for any inconsistencies in the different interpretations made from the data (Anney, 2015). The researcher ensured credibility by asking topic specific questions and reporting a true reflection of the research participants' experiences, and not the researcher's own experiences, and lastly, by using the researcher's supervisor as a co-coder further enhanced credibility.

Transferability

This refers to the generalisability of the results drawn from the study, and it indicates the extent to which the results can apply in other contexts or situations (Anney, 2015). In this study transferability was improved by employing methods such as collecting rich and descriptive data and further by utilising a purposive sampling technique. Transferability was further ensured by describing the context and setting accurately when writing the research article.

Dependability

A study meets the requirements of dependability if the same results can be obtained over a period of time, given the same research participants and context used initially (Anney, 2015). Dependability was ensured in this study by richly describing the methodology and by reporting the process truthfully.

Confirmability

This refers to limiting any possible researcher bias. This means that the results should be a true reflection of the collected data and should not be derived from the researcher's own imagination or worldview. Hence to ensure trustworthiness, objectivity formed an integral part throughout the process. Confirmability was achieved by focusing on the collected data and not on the researcher's view.

1.6.9 Reporting of data

A qualitative writing style was followed in the reporting of the research findings phase of the study and the report included themes, sub-themes and direct quotes. It was further important to ensure that the data was recorded in an ethical manner.

1.6.10 Ethical considerations

The overarching focus in terms of ethics in this research study was the well-being of the research participant (Kara & Pickering, 2017). Ethics of good standard was applied throughout the research process; it was not viewed in isolation, but was noticed in every step of the way.

Struwig and Stead (2013) suggest the following important ethical principles to be visible in all research practices:

- A qualified researcher should be on board on the research project.
- Integrity is a component which should be sustained throughout the research process.
- Professionalism and responsibility for actions are two main attributes which should be apparent throughout the research study.
- The rights and dignity of the participants must be respected at all times.
- No discrimination should take place against any group or individual taking part in the process.
- Above all else, no harm may be imposed on the research participants.

Before commencing with this study, the researcher first gained permission from the Economic and Management Sciences Research Ethics Committee (EMS-REC). Informed consent was gained by the researcher from participants. Participants were informed about the objective of the study and that participation in the study is voluntarily. Therefore no research participant was forced to partake in any way whatsoever. Participants were also free to withdraw from the study at any given time, without any negative repercussions. The identities of participants will remain confidential as well as the names of their practice. Participants were also informed that the data will only be used for research purposes. Should participants wish to receive the results of the study, they can email either the researcher or her supervisor.

The researcher or her supervisor will send a summarised report of the research results after the dissertation has been examined. The names of the participants and their practice will be protected and remain confidential and will not be mentioned within this summarised report.

1.7 Chapter division

This mini-dissertation consists of three chapters:

Chapter 1: Introduction

Chapter 2: Research article

Chapter 3: Conclusions, limitations and recommendations

1.8 Chapter summary

In Chapter 1 the problem statement, research questions and research objectives were presented. The study design was also explained, followed by a brief overview of the chapters that follow and outlined the structure of this mini-dissertation.

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CHAPTER 2: RESEARCH ARTICLE

EXPLORING THE PERCEPTIONS OF THE USE OF DIFFERENT MODES OF PSYCHOMETRIC ASSESSMENT BY INDUSTRIAL PSYCHOLOGY PROFESSIONALS

Orientation: Technology has changed numerous work practices in the field of Industrial Psychology. One of the areas that have evolved is psychometric assessments and the manner in which it is conducted. However, many Industrial Psychology professionals still prefer using traditional modes of assessment.

Research purpose: The general objective of this study was to explore and describe the perceptions of Industrial Psychology professionals with regard to the use of the different modes of psychometric assessment in the digital age.

Motivation for the study: Digitalisation expects Industrial Psychology professionals to lean towards the use of computerised and gamified psychometric assessments, but some professionals still prefer using paper-and-pencil psychometric assessments. The researcher therefore aimed to discover the subjective perceptions of Industrial Psychology professionals regarding the use of the different modes of assessment.

Research approach, design and method: This research study comprised a qualitative research method, combined with an interpretivist paradigm and a qualitative descriptive strategy. The sample consisted of Industrial Psychology professionals (i.e. Industrial Psychologists and Psychometrists, with a total sample population of ($N=21$) research participants. The data were collected by means of online qualitative surveys via *QuestionPro*, and thematic analysis was used to analyse the data.

Main findings: Various categories emerged during the data analysis process. Participants indicated that they prefer to use different psychometric assessment modes for various reasons and purposes. Participants also provided insight into the potential benefits and challenges associated with paper-and-pencil, computerised and gamified assessments. Numerous recommendations were made by participants on how psychometric assessments can be enhanced for future research and practice.

Practical/managerial implications:

When Industrial Psychology professionals are aware of all the factors that should be taken into consideration when selecting and applying different modes of assessment, high-quality standards of assessment and fairness could be achieved. Industrial Psychology professionals

will be able to identify gaps in their current practices and address these issues to ensure advancement in the assessment arena.

Contribution/value-add:

This study will provide qualitative answers and insights into the different modes of assessment that Industrial Psychology prefer to use, the reasons for using it as well as the purposes for which they use the various assessment modes. This study will further highlight potential benefits and challenges associated with the use of different modes of psychometric assessment. In doing so, Industrial Psychology professionals will be empowered to make informed decisions when applying the different modes of assessment and it also encourages the implementation of best-practice standards. This study will provide organisations with insight so as to adapt their assessment policies to ensure that it is fit for use in the digital age. This study will further enable psychometric test publishers to gain insight into the perceptions of Industrial Psychology professionals concerning the different assessment modes, and enable them to direct their efforts accordingly.

Keywords: Psychometric assessments, computerised assessments, paper-and-pencil assessments, gamified assessment, Industrial Psychologists, Psychometrists.

INTRODUCTION

‘Almost no IO-Psychology practice has gone untouched by the application of technology’ (Morelli et al., 2017, p.635). The field of Industrial Psychology is not only facing a new world of work due to organisational changes; the field has also evolved over the past decades due to technological change. Technological advancements have served as a strong driver behind evolvments in the assessment arena. The ways in which psychometric assessments are administered have transformed due to the technological changes, and the new way in which business is performed. The COVID-19 pandemic and worldwide lockdown have augmented the speed at which the assessment landscape is changing. Due to social distancing regulations, specific assessment modes have become increasingly relevant to adapt to this new context (Marasca et al., 2020). During these unprecedented times, psychometric assessments played a valuable role in the hiring process to identify talent, as no face-to-face interaction was possible (Challis, 2020). Organisations were forced to rely on the utilisation of online computerised psychometric assessments to make hiring decisions, and it served as a

replacement for face-to-face interaction (Aggarwal, 2020). Conducting psychometric assessments online during the pandemic has increased the complexity of ensuring standardised test procedures and standards.

Different modes of assessment are used in various types of scenarios and it also largely depends on the level of comfort of the Industrial Psychology professional regarding a specific mode. Hence it is important for research to be conducted to display Industrial Psychology professionals' views on the different modes to point out reasons for utilisation and non-utilisation, as this will move the profession forward. With the shift in technology it is essential to ensure that Industrial Psychology professionals agree on the modes of assessment to some extent in order to capitalise on the benefits of each mode and to address the challenges. Foxcroft and Moodack (2018) stated that the speed at which technology is advancing is threatening to outperform the rate at which these assessment practices could be controlled; therefore Industrial Psychology professionals should keep abreast of technical advances to ensure they make the right decisions. This study would be valuable to Industrial Psychology professionals to identify in which mode of assessment they may need upskilling and also for test publishers and test developers to align their efforts with the perceptions of the test users (i.e. Industrial Psychology professionals).

Paper-and-pencil assessments form part of the most basic psychometric assessment modes and it is often referred to as the traditional mode of assessment (Foxcroft & Moodack, 2018). On the contrary, Johar and Kumar (2016) pointed out that paper-and-pencil assessments are becoming less relevant in the digital age, and this could be attributed to the developments in information and communication technologies. An increasing number of organisations are deviating from using paper-and-pencil modes of assessment (Pulakos, 2005). Dullu (2017) also suggests that paper-and-pencil assessment modes transformed into online modes of assessment due to the abrupt change, which is dubbed digitalisation. Jivan et al. (2020) argue that the COVID-19 pandemic could possibly play a significant role in paper-and-pencil assessments becoming redundant.

Due to technological advancements, paper-and-pencil assessments were converted into computerised assessments. Joubert and Kriek (2009) suggested that computerised assessments originated when test publishers started automating and transforming traditional paper-and-pencil assessments for administration purposes. Tredoux (2018) stated that test

users should not underestimate the complexity of computerised assessment, and Industrial Psychology professionals should consider the consequences of their decisions concerning the use of assessment.

Gamified assessments are being increasingly used in the assessment context. There are numerous advantages to utilising gamified assessments for making talent decisions such as promoting the organisation's brand, increased internal motivation for the candidates to complete the psychometric assessment, richer data-collection compared to self-report measures, lower levels of social desirability, and reduced assessment bias (JVR Africa Group, 2020). On the contrary, Brooks (2020) argues that in some cases, gamification could possibly compromise the psychometric elements for candidate experience and may disrupt psychometric assessment for selection purposes. Therefore it would be beneficial for gamified assessments to maintain a good balance between candidate experience and psychometric rigour.

Also, Industrial Psychology professionals in South Africa are bound by the Health Professions Act No. 56 of 1974; Annexure 12, Chapter 5 stipulates the parameters of competence for professionals involved in psychological assessment activities (HPCSA, 2006). Hence it is essential for Industrial Psychology professionals to have adequate knowledge of and be fully competent in administering various assessment modes to be able to cater to individuals, teams and organisations in different instances. The Industrial Psychology professional should determine the most appropriate mode of assessment. In cases where candidates are not comfortable using computers, paper-and-pencil assessments will remain the most suitable mode to use. Laher and Cockcroft (2013) emphasised the importance of the Psychology professional to have adequate knowledge of multiple modes of assessment to be culturally sensitive and adapt to the test taker's needs. Furthermore, Foxcroft and Moodack (2018) suggested that psychometric assessments are often used for high-stake purposes, and attention should be directed towards the consequences of the outcome of assessments. Given the impact that assessment modes have on the outcome of the assessment (i.e. job placements, promotions, career decisions etc.), Industrial Psychology professionals need to be updated and aware of the capabilities and ramifications of using different psychometric assessment modes currently available. This will not only expand the knowledge base of Industrial Psychology professionals; it will also aid in drafting assessment policies. According to Morelli et al. (2017) such research is relevant, as it increases the overall

awareness of the impact that technology has on the field of Industrial Psychology and also on best practices. Therefore the researcher found it relevant to further investigate this concept.

Research purpose and objectives

The objective of this study was to explore and describe the perceptions of Industrial Psychology professionals concerning the use of different modes of psychometric assessment in the digital age. In view of this, the following research questions were posed to address the research purpose and objectives:

- How are paper-and-pencil, computerised, and gamified psychometric assessments conceptualised according to literature?
- What are the purposes for which Industrial Psychology professionals use the different modes of psychometric assessment?
- What modes of psychometric assessment do Industrial Psychology professionals use?
- What are the potential benefits associated with the use of different modes of psychometric assessment?
- What are the potential challenges associated with the use of different modes of psychometric assessment?
- What recommendations can be made by Industrial Psychology professionals to enhance the use of psychometric assessment?
- What recommendations can be made for future research and practice?

To report on the above-mentioned purpose and objectives, this chapter is structured into a literature review, empirical study, discussion as well as a section explaining limitations and proposing recommendations.

Literature review

Conceptualisation of psychometric assessments

Various definitions of psychometric assessments can be found in literature. Coetzee and Schreuder (2010) defined psychometric assessments as a psychological activity to acquire a typical representation of behaviour and thinking processes within a specific context. Foxcroft and Roodt (2013) defined psychometric assessments as an activity aimed at collecting information by means of a psychological measure to inform decision making. Bergh (2017) referred to psychometric assessments as ‘the psychological tests and other techniques for specific purposes to obtain relevant information on people’s behaviour in order to understand and explain human behaviour, to solve specific problems or make decisions’ (p.320). Coppin (2017) further described psychometric assessments as methods of measuring human qualities such as ability, personality, motivation, interests and values. From the definitions above it is clear that the main aim of psychometric assessment is to inform some kind of decision-making process.

Psychometric assessments are conducted to assess a wide range of human behaviour domains. The most prominent domain of measurement is personality, which includes both cognitive characteristics (intellectual characteristics) and non-cognitive (personality, emotions and values) (Bergh, 2017). Foxcroft and Moodack (2018) suggested that psychometric assessments can measure a variety of constructs such as cognitive functioning, aptitude, affective behaviour, adjustment and well-being, interest, motivation and personality.

Organisations utilise psychometric assessments for multiple purposes. Foxcroft and Moodack (2018) distinguished between two broad categories in which assessments are used; firstly assessments can be used to assess individuals. These assessments are usually used for the purposes of recruitment and selection, training, and development. The second category in which assessments can be used is in a team or group context; these assessments are utilised for diagnostic and development purposes (Foxcroft & Moodack, 2018).

Cripps (2017) stated that valid psychometric tools could advance recruitment and development considerably, whereas invalid assessments would have the opposite effect. In a

selection context, the overarching objective of assessments is, in psychological terms, to discover the underlying roots of perceived individual differences and then link it to a particular outcome such as predicting performance (Kumar, 2016). Olivier (2019) emphasised that the significance of psychometric measures lies within its potential to measure predefined behaviours, which informs decision making. Barnard (2013) argues that in an employment context the purpose of psychometric assessments is future-oriented, as it allows the professional to link the candidate's behavioural patterns to the job outcomes to predict the effectiveness and determine decision-making regarding selection and placement.

Psychometric assessments are also found to be valuable in development settings. Bergh (2017) indicated that psychometric assessments for development purposes include assessment for training, career development, team development and identifying problematic behaviour. Goldstein et al. (2017) also suggested that psychometric assessments are also useful after the selection process, in employee coaching and in development contexts. The focus here is on working with the individual's strengths and development areas to ensure optimal performance and successful integration into a team.

Botha (2010) suggested that psychometric assessments are increasingly used by Industrial Psychology professionals in the legal context as part of the evidence used in court to determine potential loss of income in third-party claims. Slabbert (2016) indicated that the role of the Industrial Psychology professionals in medico-legal assessments is to assess capability in the form of behavioural, emotional and mental constructs. In doing so the Industrial Psychology professional compiles a medico-legal report containing specific recommendations; it is then presented to the court for decision-making.

There are various modes of psychometric assessment, namely paper-and-pencil assessments, computerised assessments and gamified assessments. Each mode offers unique characteristics for the Industrial Psychology professional to consider. A discussion of each mode will follow:

Paper-and-pencil-based assessments

The use of paper-and-pencil assessments requires the candidate to read the assessment questions and then respond to them on an answer sheet (Government of Canada, 2007).

Paper-and-pencil assessments are referred to as the traditional form of delivering psychometric assessments. Foxcroft and Moodack (2018) suggested that a paper-and-pencil assessment involves the Industrial Psychology professional providing the candidate with face-to-face instruction and the candidate completing the assessment by using the assessment material (i.e. test booklet, answer sheet etc.). The use of traditional paper-and-pencil-based assessments expects Industrial Psychology professionals to be involved in the entire process, such as selecting an appropriate test battery, administering the assessment, scoring and interpreting the results, reporting on the results and providing feedback to the candidate (Foxcroft & Modack, 2018).

One of the advantages of paper-and-pencil-based assessments is that it allows for standardised test conditions as the administration process is controlled by the Industrial Psychology professional (Joubert & Kriek, 2009). Pulakos (2005) stated that paper-and-pencil assessments are cost-effective to develop and administer compared to the costs of other assessment modes. Even though literature refers to paper-and-pencil assessments as the traditional mode of assessment, the Health Professions Council of South Africa (2019) emphasised that the training of Industrial Psychology professionals should include adequate exposure to paper-and-pencil-based assessment without relying on any technology. This is exceptionally relevant in South Africa, seeing that a large portion of the population does not have access to information technology for assessment purposes (Bergh, 2017). A further advantage of paper-and-pencil assessments therefore is that it is more accessible to people who do not have access to technology.

Although the use of paper-and-pencil assessment is still relevant in South Africa, Tredoux (2013) suggested that certain disadvantages exist in utilising paper-and-pencil assessments. One of the disadvantages could be ascribed to human error that usually occurs in the assessment scoring stage as data could be captured incorrectly, incorrect use of scoring masks, norm table errors and errors in transcribing the scores (Tredoux, 2013). Laher and Cockcroft (2013) further proposed that a disadvantage of paper-and-pencil assessments is that it is difficult to regulate, and it presents heightened levels of susceptibility to copyright violations. Naglieri (2014) suggested that, viewed from a long-term perspective, paper-and-pencil assessments are higher in cost, considering the additional test material that needs to be purchased.

Computerised assessments

Tredoux (2018) refers to a computerised assessment as a psychometric assessment administered and scored by means of a computer system. This means that limited interaction is required between the Industrial Psychology professional and the candidate during the administration phase. The impact of technology has resulted in computerised or online psychometric assessments being perceived as the common mode of assessment, to such an extent that other modes of assessment seem to be unusual (Hodgkinson & Ford, 2012). Laher and Cockcroft (2013) suggested that computerised assessments originated from paper-and-pencil assessments and the sophistication of computerised assessment differ. This means that computerised assessments use technology in different manners.

Weiner et al. (2012) argued that computerised assessments have numerous advantages such as standardisation, a streamlined administration and scoring process, and higher levels of authenticity in test stimuli. Barnard (2013) suggested that computerised assessments have enabled Industrial Psychology professionals to conduct mass assessments quicker, accommodate candidates with disabilities, fast-track scoring and reporting, and extend databases, meaning that norms can be updated more frequently. Apart from these benefits, computerised assessments also afford the opportunity for psychometric tests to adapt to the difficulty level of the test taker's performance, which allows for rapid and more accurate results than paper-and-pencil assessments (Taylor, 2017).

Drawbacks of computerised assessments are high costs associated with the test development and the security of both the test material and the test taker's responses (Weiner et al., 2012). Bergh (2017) stated that certain factors need to be taken into account when using computerised assessments so as to ensure fairness towards the test-taker. Factors such as access to the internet and computers and the individual's familiarity with computer technology would significantly impact the test taker's performance on the assessment (Bergh, 2017). In contrast, Joubert and Kriek (2009) argued that, due to the rapid technological advancements in the Information Technology field, the accessibility to computer hardware has improved. This means that an increased percentage of the population does have access to computers, which then increases the viability of the use of computerised assessment.

Gamified assessments

Gamification has become an increasingly popular notion which aids organisations in achieving their business objectives through its application in various initiatives such as employee onboarding and engagement, selection and development (Goldstein et al., 2017). However, Armstrong et al. (2016) stated that the term ‘gamification’ is oftentimes confused by Industrial Psychology professionals as it is a broad term and application of it extends much further than the field of Industrial Psychology. Hawkes et al. (2017) defined gamification as the integration of game elements into contexts usually not associated with gaming activities, such as a work setting. The main purpose of gamification is to achieve increased user engagement levels as it plays an imperative role in organisational outcomes such as knowledge retention, entering the market, brand recognition, employee performance and talent assessment (Goldstein et al., 2017). Walker and Moretti (2018) suggest that gamified assessment’s main objective is to enhance the candidate’s experience by keeping the candidate engaged whilst measuring particular competencies. Gamified selection methods have the potential to improve selection decisions since more accurate job performance predictions can be made (Georgiou et al., 2019).

Gamification is a concept that has had a profound impact on the assessment arena due to technological advancement. Akoodie (2020) refers to gamification as a concept of adding game fundamentals to different contexts such as engineering, education and lately to psychological assessment. Gamification is applied in the field of Industrial Psychology in the form of gamified assessments where the focus is on gameplay behaviour (Armstrong et al., 2016). Validity is a prominent issue in gamified assessments. However, Levy et al. (2016) suggested that studies have shown that gamified assessments hold the potential of delivering the psychometric properties similar to traditional psychometric assessments; further studies should thus be directed towards contributing to literature in this field.

Armstrong et al. (2016) stated that a gamified assessment is not a separate game, but a standing form of assessment that has been enriched by game elements. Akoodie (2020) further suggested that one of the advantages gamified assessments have over other assessment modes is its ability to explore candidates’ internal thinking patterns over a period of time. Goldstein et al. (2017) emphasised that gamified assessments do not only yield higher predictive validity than traditional modes of assessment; it also is capable of creating

higher levels of engagement. The test fairness perceived by the candidate is a critical element to consider in the utilisation of gamified assessment. Georgiou and Nikolaou (2020) suggested that apart from the predictive validity, the candidate's satisfaction with the mode of assessment would positively impact their perception of fairness.

Literature also outlines the disadvantages associated with gamified psychometric assessments. Akoodie (2020) mentioned that the inequalities in South Africa create challenges for individuals to not only access technology to be assessed in the gamified mode; access to WiFi is also limiting. A further concern regarding gamified assessments is the possibility of test results being compromised due to insufficient language proficiency and low technology agility levels (Jivan et al., 2020). Cut-e Group (2017) suggested that gamified assessments may attract a specific pool of individuals, whilst others might not enjoy games, implying that this mode of assessment can negatively impact the test-takers' performance. Face-validity is yet another consideration as the gamified assessment should to some degree match the desired outcome, for example in a selection context, war games might be perceived as inappropriate; thus lose face-validity (Cut-e Group, 2017).

In conclusion, it is clear that the utilisation of different modes of psychometric assessment requires careful consideration, especially bearing in mind the pace of technological advancement in a diverse setting such as South Africa. Therefore the general objective of this study is to explore and describe the perceptions of Industrial Psychology professionals regarding the use of the different modes of psychometric assessment in the digital age.

RESEARCH DESIGN

The research design consists of the research approach, research strategy, and research method.

Research approach

This study employed a qualitative research design with a view to describe the perceptions of Industrial Psychology professionals regarding the use of different modes of psychometric assessment. Taylor et al. (2015) described qualitative research as a research design that

allows the researcher to understand the participants' experiences of the issue under study from their perspectives. An interpretivist paradigm was well-suited to this study as the researcher aimed to explore and understand the lived experiences of individuals concerning a specific psychological phenomenon (Bitzas et al., 2020). In this case Industrial Psychology professionals have first-hand experience in the different modes of psychometric assessment; therefore numerous realisms regarding the phenomenon may exist. Khan (2014) suggested that an interpretivist paradigm allows for both the researcher and the research participant's view of reality as the researcher simplifies and interprets meaning. The meaning that one Industrial Psychology professional may ascribe to the different modes of assessment could differ from those of other professionals.

Research strategy

A qualitative descriptive research strategy was followed in this research study. The researcher aimed to investigate the experiences of the participants' experiences of the different modes of psychometric assessment. The purpose of a qualitative descriptive research strategy is to examine the experiences of the research participants (Siedlecki, 2020). Williams (2007) stated that the participant's perception of a subject is regarded as the main focus and by studying it, questions can be answered. Lambert and Lambert (2012) proposed that the value of employing a qualitative descriptive research strategy is that it allows the researcher to study the phenomenon under study in its natural form as minimum manipulation takes place. Kim et al. (2017) suggested that a benefit of utilising a qualitative descriptive research strategy is that it allows for a fair degree of flexibility in the design, which ensures that the researcher collects rich data. The research participants in this research study consisted of registered Industrial Psychology professionals (i.e. Industrial Psychologists and Psychometrists) in a quest to establish how they experience the use of different modes of psychometric assessment.

Research method

The research method consisted of the research setting, entrée and establishing researcher roles, sampling, research procedures, data collection method, data recording, strategies

employed to ensure the quality of data and integrity, reporting style and ethical considerations.

Research setting

In this study, data were collected from registered Industrial Psychology professionals who were self-employed and in private practice, via written online surveys. The research participants completed the online surveys on a platform called QuestionPro. Even though no definite research setting was present, the online platform allowed the participants flexibility to participate in the study in their own time. Seeing that data was collected during the COVID-19 pandemic, the use of written online surveys was in line with the regulations at that time as the researcher had no face-to-face interaction with the research participants. This meant that the participants could complete the survey in a time and location that suited them.

Entrée and establishing researcher roles

The researcher fulfilled multiple roles during this research study. The researcher firstly fulfilled the role of a planner, which involved planning the research study and writing the proposal to meet the research objectives. The researcher planned and co-ordinated the data collection and analysis of data. Commencement of the study took place once the Economics and Management Sciences Research Ethics committee (EMS-REC) granted ethical clearance to proceed with the study. Thereafter, the researcher fulfilled the role of a data collector. The researcher utilised the i-Register function on the website of the Health Professions Council of South Africa (HPCSA) to identify prospective research participants (i.e. Industrial Psychologists and Psychometrists) within the Gauteng and North-West provinces. After acquiring the prospective research participants' contact details, the researcher contacted the individuals via email, explained what the study entails and requested them to take part in the study.

The researcher then provided the individuals who indicated their interest in the study with information on the aim of the study, voluntary participation, withdrawal, the use of personal information, access to the data obtained and access to the results as well as a link to the qualitative study on QuestionPro. The researcher collected the data by retrieving it on the online platform. Subsequently the researcher fulfilled the role of a data analyser, and

analysed the data together with the co-coder, an expert in Industrial Psychology. After in-depth analyses, the researcher lastly fulfilled the role of a report writer. In the report-writing phase, the researcher presented the findings of the study and critically evaluated the findings against current literature. Neutrality and objectivity remained key considerations throughout the study through frequent interaction with the co-coder, ensuring that the study remained free from biases.

Research participants and sampling

A combination of purposive sampling, in the form of expert sampling and snowball sampling was employed in this study for data collection purposes. Purposive sampling allowed the researcher to access the knowledge of the research participants. Expert sampling is a non-probability sampling technique, and it involves the researcher selecting the participants based on their specific characteristics such as experience and knowledge of a particular subject (Etikan et al., 2016). In this case the researcher selected Industrial Psychology professionals (i.e. Industrial Psychologists and Psychometrists) due to their experience in and knowledge of psychometric assessments. One key distinctive of expert sampling is that the research participants need to meet certain criteria to qualify as a research participant for the specific study (Omona, 2013). The researcher applied the following inclusion criteria to select research participants: 1) the research participants had to be registered Industrial Psychology professionals (i.e. Industrial Psychologists or Psychometrists); 2) Participants had to have experience in the use of psychometric assessments within their practice; 3) participants had to be proficient in at least English; and 4) participants had to be willing and able to complete a written online qualitative survey.

Snowball sampling was also applied in the study. Struwig and Stead (2013) suggested that snowball sampling is often used when the pool of participants are uncommon populations to find in the data collection process. Snowball sampling would usually come into effect once the research study has commenced seeing that additional participants can only be reached through networking with current research participants (Omona, 2013). In this study, the researcher identified a pool of participants and obtained the contact details of other Industrial Psychology professionals from them. The total sample population consisted of ($N=21$) Industrial Psychology professionals.

Table 1

Characteristics of participants (N=21)

Item	Category	Frequency (f)	Percentage (%)
Age	24 – 34	16	76.19
	35 – 45	4	19.05
	46 - 50	1	04.76
Gender	Female	17	80.95
	Male	4	19.05
Ethnicity	African	0	00.00
	Coloured	1	04.76
	White	20	95.24
	Indian	0	00.00
Home Language	Afrikaans	14	66.67
	English	7	33.33
	Setswana	0	00.00
	isiXhosa	0	00.00
Occupation	Industrial Psychologist	10	47.62
	Psychometrist	11	52.38

The research study included 21 research participants. Table 1 illustrates that the majority of participants (76%) were found to be aged between 24 and 34. There were 81% females and 19% males who participated in the research study. Most of the participants were white (95%), while more than half (67%) was Afrikaans speaking. The majority of participants were registered Psychometrists (52%).

Data collection method

Written online interviews (i.e. qualitative surveys) were utilised to collect the required data for this study. The research participants were requested to complete the survey on an online portal (i.e. QuestionPro). The use of this method meant that the researcher was not present while the research participants were completing the survey. Sowa et al. (2015) suggested that this form of data collection can be referred to as the Computer Assisted Web Interview method and the method is gaining popularity, given the rate at which technology is

advancing. The researcher found it relevant to use this data collection method seeing that the subject under study aims to compare the utilisation of the different modes of assessment in the digital age.

The researcher sent an email to the research participants with information regarding the study. The email consisted of general information and how to access and navigate the online portal to complete the survey. The participants accessed the survey by opening the link and they were provided with an information page, outlining the objective of the study, voluntary participation, withdrawal from the process, the use of data and the safekeeping of personal information. After having read the information page, the research participants had to give consent on the online platform if they agreed with the informed consent information.

Xu et al. (2020) suggested that informed consent should be regarded as essential when conducting ethical research as it is an opportunity to not only increase participant understanding, but to also set parameters. The research participants were also required to complete a brief demographic profile, enabling the researcher to describe the population. No comparisons were made or inferences drawn from the demographic data collected.

All the participants were requested to answer the following questions in the online survey:

- Please explain the purposes for which these psychometric assessments are being used within your practice. Please provide a detailed answer.
- There are different modes of psychometric assessment, namely paper-and-pencil, computer-based and gamified psychometric assessment. Which modes of psychometric assessment do you use within your practice? Please provide reasons for your answer.
- Do you prefer using, paper-and-pencil, computerised, or gamified psychometric assessments within your practice? Please provide explanations for your answer.
- Do you prefer using, paper-and-pencil, computerised, or gamified psychometric assessments within your practice? Please provide explanations for your answer.
- Taking into consideration the modes of psychometric assessment that you use within your practice, what are the benefits of using each of these modes of psychometric assessment? Please provide a detailed answer.

- Taking into consideration the modes of psychometric assessment that you use within your practice, what are the challenges of using each of these modes of psychometric assessment? Please provide a detailed answer.
- What recommendations would you make to enhance the use of psychometric assessments? Please provide a detailed answer.

Recording of data

The research participants were reassured of the confidentiality, safekeeping of data and personal information in the information sheet on the online platform. The safekeeping and storing of data was a priority for the researcher and the use of the online platform ensured that the data could be saved automatically. The data was then transferred to a password-protected Microsoft Excel sheet for the researcher and the co-coder to further analyse the data on a password protected computer. Thereafter, the data were stored and will be kept for five years. The only persons who had access to the data were the researcher and her supervisor.

Data analysis

Thematic analysis was applied in this study to process and analyse the data. Maguire and Delahunt (2017) defined thematic analysis as ‘the process of identifying patterns or themes within qualitative data’ (p. 3352). Nowell et al. (2017) suggested that thematic analysis is extensively used in qualitative research due to the degree of flexibility it offers regardless of the epistemology and research questions. By employing thematic analysis in this research study, it enabled the researcher to identify themes and patterns in the analysis phase. The analysis allowed the researcher to further formulate interpretations from the rich data. Braun and Clarke (2006) proposed the following steps of thematic analysis, which were used in this research study as well:

Phase 1: Familiarising oneself with the data

In this step, the data set was extracted from QuestionPro in the form of an Excel sheet. Thereafter, prior to the analysis, the researcher repeatedly read through the data set to familiarise herself with the data. During this stage, notes were also made to stimulate an

active thought process. While the researcher familiarised herself with the data, she could start structuring possible codes.

Phase 2: Generating initial codes

At this point, the researcher aimed to identify patterns in the data set to construct the themes and sub-themes while bearing in mind the research objectives and research questions. The researcher identified the following categories in the dataset: *Utilisation of different modes of psychometric assessment, purposes of psychometric assessment, reasons for non-utilisation of psychometric assessment, experience of paper-and-pencil assessments, benefits of paper-and-pencil assessment, challenges of paper-and-pencil assessments, experience of computerised assessment, challenge of computerised assessment, benefit of computerised assessment, experience of gamified assessment, benefit of gamified assessment, challenge of gamified assessment, recommendations to enhance the use of psychometric assessments.* During this stage, the researcher gathered an extensive list of codes.

Phase 3: Searching for themes

After categorising the codes, the researcher and the co-coder sorted and combined the list of codes into various themes and sub-themes. The co-coder's involvement in this process ensured that objectivity could be maintained. During this stage, the researcher and the co-coder refined the codes by following a process of identifying commonality, considering new themes and merging themes where possible.

Phase 4: Reviewing themes

During this phase, the researcher aimed at reviewing the themes to ensure that they form a clear pattern and that it is a true reflection of the data, up to the point where the themes could be finalised. The researcher further ensured that themes fit and are not duplicated.

Phase 5: Defining and naming themes

During this phase, the researcher's attention was directed towards the content of each theme and the accuracy of the themes compared to the data. The researcher redefined the themes and recorded sub-themes. Thereafter, the themes were described.

Phase 6: Producing the report

This was the final stage of the analysis and it involved the researcher writing up and reporting the findings in a clear and logical manner, ensuring that the reader can easily understand it. The themes and sub-themes were presented in tabular form in Chapter 2 of this mini-dissertation. The interpretation and the discussion were included and explained thoroughly. The researcher further compared the findings with existing literature, whilst ensuring that scientific standards were maintained.

Strategies employed to ensure data quality and integrity

In this study, the researcher employed specific strategies to ensure quality data and trustworthiness of the findings. The following four criteria proposed by Anney (2015) were applied: 1) credibility; 2) transferability; 3) dependability; and 4) confirmability.

Credibility: This refers to the consistency between the research participants' perspectives and the researcher's depiction of their perspectives (Tobin & Begley, 2004). In this study, the researcher used structural coherence to establish credibility. Anney (2015) suggested that structural coherence could be achieved by searching for discrepancies in the data. The researcher further ensured trustworthiness by collaborating with the co-coder, who is an Industrial Psychology expert. In addition, credibility was increased by posing topic-specific questions and reporting on the research participants' actual experiences in an attempt to contain the researcher's own bias.

Transferability: This refers to the degree to which the context of the study could be applied in other contexts (Pratt et al., 2020). The researcher aimed to achieve transferability in this study by collecting data that are rich and descriptive in nature and by employing a purposive

sampling method. Transferability was lastly ensured by accurate reporting of the context and the setting in the research article.

Dependability: This refers to the consistency in results should the study be repeated, given the same context (Amankwaa, 2016). Dependability was increased in this study by truthfully reporting the research process and describing the research methodology in detail to provide the reader with adequate details of the study.

Confirmability: This refers to the process of verifying the collected data and limiting researcher bias (Pratt et al., 2020). Throughout the process, objectivity served as a cornerstone in the study. The researcher consistently focused on the collected data without interfering with the responses. The researcher further ensured neutrality by making use of a co-coder who reviewed the themes and the sub-themes.

Reporting

The findings of the research study were reported in tabular format, which included themes and sub-themes. Direct quotes of the collected data were included to substantiate the themes and sub-themes. Below each table, a description along with an interpretation was provided. The researcher further evaluated the research findings against past literature in order to support and negate the findings.

Ethical considerations

In qualitative research, the balance between the researcher's personal ethics and those under study should not be underestimated (Iphofen, & Tolich, 2018). The researcher perceived ethics as a 'golden thread' that was sustained throughout the study. The following ethical standards were implemented:

- *Ethical clearance obtained* – Permission to commence with the study was gained from the Economic and Management Sciences Research Ethics Committee (EMS-REC).

- *Voluntary participation* – The researcher informed the participants about the objective and the procedures of the study. Participants were also made cognisant of their voluntary participation in the study and permission that they could withdraw from the study at any given time without the risk of facing any negative consequences (Flemming & Zegwaard, 2018).
- *Informed consent* – Research participants were afforded the opportunity of reading the information regarding the study (Roshaidai & Arifin, 2018). Informed consent was obtained from research participants to partake in the study, accompanied by information such as the objective and purpose of the study, expectations, access to the findings and data storage.
- *Anonymity and confidentiality* – The researcher informed the participants that their identities and the names of their practices or organisations would remain confidential at all times. The process was dealt with on an anonymous basis, and no personal identifiers were displayed in the findings (Flemming & Zegwaard, 2018). Participants were also informed that they could contact the researcher or her supervisor, should they wish to receive the results. A summarised report of the results will then be sent to them after the examination of the dissertation. Anonymity and confidentiality will also be upheld in the summarised report.
- *Safekeeping of data* – The research participants were informed that the researcher and her supervisor are the only people who have access to the collected data, and that it will be stored for five years. After five years the electronic data will be permanently deleted.
- *Beneficence and non-maleficence* – Above all else, it was essential for the researcher to avoid any possible harm to research participants by adhering to the ethical standards of beneficence and non-maleficence (Struwig & Stead, 2013).

FINDINGS

The findings of the research were structured into categories, themes and sub-themes. The findings were presented in tabular format and discussed below each table. Direct quotes were also used to support the results.

Category 1: Purposes for which Industrial Psychology professionals use the different modes of psychometric assessment

In this category participants were requested to indicate the purposes for which they use the different modes of psychometric assessment within their organisation or practice. The responses are presented in Table 2 below.

Table 2

Purposes for which Industrial Psychology professionals use the different modes of psychometric assessment

Theme	Response
Career guidance	<i>"I currently use these assessments for subject choice guidance."</i> <i>"Career guidance (subject choices/study directions for high school/and university students)."</i> <i>"Subject choice guidance for grade 9s, career guidance for school-aged children as well as adults..."</i>
Development	<i>"Developmental - to use the assessments to determine for example inclination to a certain personality type, strengths and weaknesses, and needs analysis so as to develop the person for optimal functioning."</i> <i>"...Team building where teams may be newly formed and need to become a high-performing team in a short period of time or where teams experience conflict."</i> <i>"Developmental purposes and projects - here we can understand the strengths and development areas across individuals and teams, and create interventions based on this."</i>
Employee wellness	<i>"Behavioural assessments are used for employee wellness..."</i> <i>"...Wellness..."</i>
Learnerships and bursaries	<i>"Selection to recruit the most suited candidate for the job role or bursary programme."</i> <i>"SETA learnerships (shortlisting of candidates to be included in FOODBEV learnerships, discretionary grants for various companies)."</i> <i>"Determining the potential to perform to be included in a learnership program."</i>
Medico-legal reports	<i>"Medico-legal (Third-party assessments of the plaintiff in regional-court cases - to</i>

	<i>determine for example depression, stress, pain, anxiety, etc. for compiling the Industrial psychologist report).</i> <i>"Medico-Legal assessments to write reports."</i>
Mentoring and coaching	<i>"...Mentoring programmes."</i> <i>"...Self-development and coaching."</i> <i>"Coaching (to help candidates understand themselves for development, for example SORT or JPQ)."</i>
Organisational climate and culture	<i>"...Determine organisational climate and culture."</i> <i>"...Succession planning, culture surveys..."</i>
Performance management	<i>"...Additional information for performance management."</i> <i>"Talent management, 360s etc."</i>
Recruitment and selection	<i>"Recruitment - middle management and higher are required to complete assessments as part of the recruitment process..."</i> <i>"...Psychometrics typically form part of the final stages of our recruitment and selection process. Usually serves as a final validation and recommendation tool."</i> <i>"Our company mostly use psychometric assessments for recruitment, in order to measure a candidate's abilities and personality and the extent to which the candidate will fit the requirements of the applied position."</i>

Table 2 indicates the purposes for which participants use the different modes of psychometric assessment in their practices or organisations. Quotes were also provided to indicate the responses associated with the themes. A discussion on the themes follows below:

Career guidance: The participants indicated that they use psychometric assessments for career guidance; specifically for subject choices and study direction guidance for high school learners, and career planning for adults.

Development: Participants pointed out that they use assessments for development purposes, particularly team development, personal and professional development, and leadership development. Participants further mentioned that the core focus of development assessments is to identify and understand candidates' strengths and weaknesses, and subsequently to recommend interventions for them to reach their full potential.

Employee wellness: Some participants indicated that they use assessments for well-being evaluation purposes; specifically behavioural assessments.

Learnerships and bursaries: Assessments are used to select individuals for bursary programmes, learnerships and discretionary grants. Participants emphasised that the objective is to determine the potential to perform in these programmes.

Medico-legal reports: The participants indicated that they use assessments for medico-legal reports and third-party assessments in court cases. Specific mention was made to the content of the Industrial Psychology professional's report, which would typically include information regarding depression, stress, pain, anxiety etc.

Mentoring and coaching: Some participants mentioned that they use psychometric assessments for mentoring and coaching purposes, as it aids individuals in gaining a better understanding of themselves.

Organisational climate and culture: Participants mentioned that they use assessments to determine organisational climate and culture.

Performance management: Some participants indicated that psychometric assessments serve as a valuable source of information in performance management initiatives.

Recruitment and selection: Participants mentioned that they use assessments in a recruitment and selection context. Specific reference was made to the use of assessment to measure a candidate's abilities and personality to determine person-job-fit. Participants also mentioned that assessments are usually conducted in middle and senior management in the final stages of the process.

Category 2: Utilisation of different modes of psychometric assessment

In this category participants were provided with the three different modes of psychometric assessment (i.e. paper-and-pencil, computer-based and gamified assessments). They were then requested to indicate which modes of psychometric assessment they use within their organisation or practice as well as the reasons for utilisation and non-utilisation of these different modes. The responses are presented in Tables 3 and 4 below.

Table 3

Utilisation of different modes of psychometric assessment

Theme	Sub-theme	Response
Computerised assessments	Reaches a wider audience	<i>"...It is much easier to reach a wider audience..."</i> <i>"...Due to the geographically dispersed candidates who take these assessments for selection or development..."</i>
	Reduces amount of administration	<i>"...It takes a lot of administrative duties from the process..."</i> <i>"...Can reduce admin time..."</i>
	Generates automated report	<i>"...Usually involves automated reporting."</i> <i>"...Automatically generated feedback reports..."</i>
	User-friendly	<i>"...Convenient for use every day. Easy to find, compare and organise the results of multiple candidates."</i> <i>"...Easy to navigate, to buy credits, to interpret results."</i> <i>"...Due to its easy access and straightforward systems."</i>
	Compliance with Covid-19 regulations	<i>"...We prefer computer-based as this is easiest at the moment in terms of social distancing."</i> <i>"...Due to the COVID-19 lockdown and restrictions we were forced to incorporate more online/computer-based assessments."</i>
	Strictly controlled time limits	<i>"...This method proved to have more controlled time limits..."</i> <i>"...standardised instructions and timing..."</i>
	Mobile friendly	<i>"I prefer to use assessments that are computer-based and mobile-friendly..."</i> <i>"...It's mobile friendly and accessible anywhere."</i>
	Automated scoring	<i>"...It is easily scored..."</i> <i>"...Ensures accurate scoring..."</i>
	Suitable for mass-testing	<i>"...Allow for higher volumes of people to complete the assessment."</i> <i>"...For larger groups, we prefer computerised assessments normally."</i>
	Cost-effective	<i>"...No need to buy expensive booklets or answer sheets."</i> <i>"...Cost-effective, especially in this generation we are in. Time is money."</i>
	Quick turnaround time	<i>"...Turnaround time for reporting is convenient."</i> <i>"It is also very efficient and fast in showing results such as raw scores and short interpretations."</i> <i>"Computerised assessments are preferred due to the quick turnaround time..."</i>
	Time efficient	<i>"...It's quick to gather data..."</i> <i>"...It's more time and cost-effective."</i> <i>"...Administration is not time-consuming..."</i>
	Allows for remote administration	<i>"You can also assess without too much effort at any premises."</i> <i>"...Allows for remote assessment..."</i>
	Allows for remote supervision	<i>"...As it allows for remote assessment and supervision..."</i> <i>"...With video recordings and web cameras, candidates'</i>

		effectiveness in programmes could be monitored and cheating could be countered.”
	Standardised process	“...More standardised.” “...Standardised instructions...” “...It allows for the same pattern and experience every time as it is done in a specific order by the computer.”
Paper-and-Pencil assessments	Cost-effective	“...More cost-effective.” “Paper-and-pencil was preferred as it was the most cost-effective assessment method...” “...Paper-and-pencil, as it is cost-effective.”
	Suitable for candidates with lower levels of computer literacy	“Workers with less experience using computers, or who fall more towards the blue-collar industry, I prefer to use paper-and-pencil because it makes them more comfortable, and it is fairer towards the person.” “...For lower levels of employment that did not require computer literacy. For school children from rural areas this method proved to be the most effective as they lack basic computer skills.” “I work in the warehousing and retail industry with a lot of low-income employees and employees not as computer literate, where I find the use of paper-and-pencil assessments is less intimidating.”
	Suitable for mass-testing	“Paper-based assessments are easier for mass-testing like at schools...” “Paper-and-pencil, if I am doing assessments mostly for school children in large numbers.”
	Suitable for candidates without access to computers	“...Do not have access to the internet and computers to use this method.” “...With limited access to technology...”
Gamified assessments	Suitable for younger candidates	“...We developed a gamified psychometric assessment for the younger generation. We need to adapt our approach in order to keep younger people engaged during the assessment.” “...For selection, especially for graduates.”
	Not knowledgeable about this new mode of assessment	“I have little to no experience with gamified assessments, but I do believe that it has eminence potential and as I grow in the industry, I would like to explore these assessments in full.” “I am yet to use gamified assessments, but I am very interested to experiment with this mode.” “I definitely want to learn and make use of gamified testing.”

Table 3 indicates the modes of assessment that the participants use in their practices or organisations. Quotes were also provided to indicate the responses associated with the themes. A discussion follows below on the themes:

Computerised assessments: Participants held the opinion that computerised assessments enable the Industrial Psychology professional to reach a wider audience seeing that the geographic dispersion of candidates does not impact on the assessment. Participants further mentioned that computerised assessments decrease the amount of admin required to perform an assessment. They further mentioned that computerised assessments also hold benefit for the Industrial Psychology professional seeing that automated reports could be generated which aid in the interpretation phase. The participants argued that computerised assessments are user-friendly as they find it convenient, easy to access, easy to navigate online systems, co-ordinating the admin behind the assessment and eventually interpreting the results. In addition, specific reference was made to the utilisation of computerised assessment during the COVID-19 pandemic as it allowed participants to assess candidates while still adhering to regulations.

Participants further described that computerised assessments have strictly controlled time limits, which ensures that the test-taker sticks to the assigned time limits as the software is developed in that way. Some participants mentioned that specific computerised assessments are mobile-friendly, which increases the accessibility for candidates. In addition, automated scoring systems guarantee that scoring is done accurately. Participants indicated that computerised assessments are suitable for mass-testing. Some participants also suggested that this mode is cost-effective, seeing that it is unnecessary to purchase test material such as answer sheets and booklets.

Computerised assessment further allows for a quick turnaround time in scoring, interpreting, reporting and feedback. Participants mentioned that this mode is time efficient since less time is spent on assessments, which means that Industrial Psychology professionals can focus their time on other work. The participants further mentioned that computerised assessments allow for remote administration, which means that candidates can be assessed at any time in any location. Remote supervision was also mentioned; this allows Industrial Psychology professionals to supervise candidates via a web camera, enabling them to monitor progress and limit cheating. The participants also mentioned that standardisation could be achieved through computerised assessments as instructions are not altered per assessment, and the test conditions remain steady.

Paper-and-pencil assessments: Some participants mentioned that paper-and-pencil assessment is a cost-effective mode of assessment to utilise. The participants further suggested that paper-and-pencil assessments are suitable for candidates with lower levels of computer literacy. Specific references were made that paper-and-pencil assessments are fair to use for blue-collar workers and they are more comfortable with this mode. Some participants mentioned that lower-level employees and children in rural areas find this mode less intimidating. They further indicated that paper-and-pencil assessments are suitable for mass-testing, specifically when assessing school children. The participants lastly suggested that this mode of assessment is the most accessible for those candidates who do not have access to computers and other technology.

Gamified assessments: The participants indicated that gamified assessments are suitable for younger candidates, seeing that it keeps them engaged while completing the assessment. Specific reference was also made regarding the use of gamified assessment for graduate selection purposes. Participants further mentioned that they are not knowledgeable about this new mode of assessment due to limited exposure to it. However, they indicated that they are curious and are willing to explore and learn more about gamified assessments.

Table 4

Reasons for non-utilisation of the different modes of psychometric assessment

Theme	Sub-theme	Response
Computerised assessments	Unpredictability of electricity and internet connection	<i>"I am afraid that there is load shedding or that I do not have a strong internet connection."</i>
Paper-and-pencil assessments	Extensive administration process	<i>"...Time-consuming to score and report on..." "Paper-and-pencil as these takes time to score..." "It is more admin and processes..."</i>
	Obsolete	<i>"Paper-and pencil is outdated..." "Paper-and-pencil is outdated, obsolete..." "Paper-and-pencil - Just feel it is outdated..."</i>
	Susceptible to human error	<i>"...Increases the likelihood of 'human error' with scoring." "More margin for human error in terms of scoring." "...There is more scope for error in scoring."</i>
	Non-compliance with COVID-19 regulations	<i>"...Difficult to apply in the Covid-19 situation." "...Particularly difficult given the COVID-19 situation."</i>
Gamified assessments	Expensive	<i>"...It is really expensive in most cases." "This method proved to be more expensive for the current infrastructure of the organisation..." "It has also been regarded as a more expensive type of"</i>

	<i>assessment mode by many in our company..."</i>
Not familiar with the validity and reliability of this mode of assessment	<i>"I would need to investigate if there are tools which may add value to my assessment process and also what the validity of these tools are, if norm studies have been done and whether they are classified / under review with the HPCSA."</i> <i>"Gamified assessments are relatively new, and I am sceptical of their reliability and validity."</i>
Not knowledgeable about this new mode of assessment	<i>"Gamification - still relatively new and I don't know that much about this line of testing."</i> <i>"...Maybe due to lack of knowledge or the fact that it is a newer mode."</i> <i>"I am also not aware of many gamified assessments at this stage that meet the needs of our organisation - we focus a lot on career guidance and aptitude more than assessments for other purposes."</i>

Table 4 indicates the modes of assessment which the participants do not use in their practices or organisations. Quotes were also provided to indicate the responses associated with the themes. A discussion follows below on the themes:

Computerised assessments: One participant indicated that they do not use computerised assessments due to the unpredictability of electricity and internet connection, impacting the assessments negatively.

Paper-and-pencil assessments: Participants indicated that they do not use paper-and-pencil assessments due to the extensive administration process involved, particularly in scoring and reporting. They further mentioned that their non-utilisation of this mode could be ascribed to paper-and-pencil assessments that have become obsolete and outdated. Some participants suggested that this mode of assessment is also more susceptible to human error. They also mentioned that the use of paper-and-pencil assessment could not be used during the COVID-19 pandemic as the practice thereof did not comply with the regulations.

Gamified assessments: The participants described gamified assessments as expensive; therefore they do not use it. They further suggested that the assessment mode is not easily accessible, and it is difficult to find service providers. Participants mentioned that they do not use gamified assessments because they are not familiar with the validity and reliability of this mode. They are also unaware of any norm studies and whether gamified assessments are

classified with the Health Professions Council of South Africa. The participants further indicated that they do not use gamified assessment due to a lack of knowledge of this new assessment mode.

Category 3: Potential benefits associated with the use of different modes of psychometric assessment

In this category participants were requested to indicate the potential benefits associated with the use of different modes of psychometric assessment. The responses are presented in Tables 5, 6 and 7 below.

Table 5

Potential benefits associated with the use of computerised assessment

Potential benefits – Computerised assessment	
Theme	Response
Access multiple assessments on one portal	“...Convenient for multiple assessments...” “...Can use various assessments in one sitting.” “...Offer many options for the tests...”
Allows for an integrated competency report-writing system	“...It enables me to make use of a central assessment platform where all assessment reports are centralised. This again, enables me to use an integrated competency report-writing system where algorithms are used to integrate the different assessment results...” “Systems driven online psychometrics also provide for strong integration.”
Allows for remote administration	“...Clients do not need to come to an office and can do the assessment remotely at their leisure. It also allows you to assess candidates all over the world.” “...It’s very convenient for both internal employees and clients as we don’t have to be on site, we can assess remotely.” “...Allows for remote administration...”
Automated scoring	“...The scoring processes are normally automated...” “Scoring happens automatically, it is so much quicker.” “...It is beneficial since the scoring processes are mostly automated...”
Compliance with Covid-19 regulations	“...During Covid-19, I have managed to continue practicing using online technology such as Zoom, to conduct supervised assessments...” “...Very convenient especially during the pandemic...”
Decreased possibility of missing responses	“...Candidates are unlikely to miss answering questions since the formatting will not allow them to continue without answering all questions.” “...Algorithms ensure that all responses and actions are captured.” “...It ensures that no questions are skipped or missed during assessments...”
Eliminates human error	“...Relying on algorithms, which eliminate mistakes in scoring...” “...Prevents any data capture error...”

	<i>"...Less mistakes (if any) are made..."</i>
Enjoyable experience	<i>"I truly enjoy these assessments purely because of the flexibility and accessibility it provides."</i> <i>"...I really like computerised assessments..."</i>
Future of psychometric assessment	<i>"...I am, however, excited and hopeful of a future in SA where computer-based assessments will be the norm..."</i> <i>"...It is the future of assessments and allows for the use of Artificial Intelligence in assessment instruments to help clients make better decisions."</i> <i>"...Computerised testing is definitely the future of psychometric assessments in this rushed world where more and more people work remotely..."</i>
Generates an automated report	<i>"...Reports are available on assessment portals and you have easy access to it."</i> <i>"...Automatically generated reports."</i> <i>"Quick and easy automated reporting..."</i>
Increases objectivity	<i>"...It helps keep the report-writing very objective..."</i> <i>"...I feel that it's more objective..."</i> <i>"...Limiting the impact of professional judgement and bias..."</i>
Reaches a wider audience	<i>"...We have presence in a few countries."</i> <i>"...Computerised assessments ensure that I can connect with international clients and candidates."</i> <i>"...Broadens your potential client base."</i>
Quick turnaround time	<i>"It is quick, easy and generating reports automatically allows for a quick turnaround time..."</i> <i>"...Quick turnaround time with automatically generated reports..."</i> <i>"...Client enjoys quick set up and turnaround time for decision making."</i>
Real-time report generation and reporting	<i>"...It helps with the marking of assessments as you get immediate results..."</i> <i>"...The results are readily available."</i> <i>"...Reports are generated immediately."</i>
Reduces the amount of administration	<i>"...More admin-friendly..."</i> <i>"...There isn't much of an administrative burden involved with computer-based assessments."</i>
Safe and secure online portal	<i>"...The platforms from where assessments are launched are safe and secure and it also stores all reports."</i> <i>"It is the most secure with the digital security measures in place."</i>
Suitable for mass-testing	<i>"Computerized assessments are a great tool especially when there is a need to test many individuals."</i> <i>"...The most time-effective with large amounts of candidates that needs to be assessed..."</i>
Time-efficient	<i>"Less time-consuming..."</i> <i>"Computerised testing is definitely more timesaving..."</i>
User-friendly	<i>"Computerised assessments can be completed by candidates in the comfort of their own home, meaning that they may not even need to put in leave to complete a battery of assessments."</i> <i>"...Easy to use for most people..."</i> <i>"...Efficiency and ease of use is paramount..."</i>

Table 5 indicates the benefits associated with the use of computerised assessments. Quotes were also provided to indicate the responses associated with the themes. Below, a discussion on the themes follows:

Access multiple assessments on one portal: Findings suggested that participants perceive computerised assessments beneficial due to the convenience of accessing multiple assessments, allowing the candidate to complete various assessments on one portal.

Allows for an integrated competency report-writing system: Participants mentioned that computerised assessments are beneficial, because it provides the Industrial Psychology professional with integrated reports, this means that one report contains the results of various assessments used in the battery.

Allows for remote administration: Participants suggested that computerised assessments allow Industrial Psychology professionals to administer assessments remotely, this means that assessments are not bound to a time or location.

Automated scoring: Some of the participants mentioned that computerised assessments are beneficial due to the scoring process which is automated; thus the results are processed much quicker.

Compliance with Covid-19 regulations: Participants suggested that during the COVID-19 pandemic, they specifically benefitted from computerised assessment. They were able to supervise assessments online via applications such as 'Zoom'.

Decreased possibility of missing responses: Findings suggested that participants indicated that computerised assessments are beneficial because it eliminates the likelihood of candidates skipping questions. This means that an automatic capturing system ensures that all responses or actions are captured.

Eliminates human error: Participants mentioned that a further benefit of computerised assessments is higher accuracy seeing that data capturing mistakes and scoring errors are eliminated.

Enjoyable experience: Some participants indicated that they enjoy computerised assessments and benefit from the flexibility and accessibility associated with this assessment mode.

Future of psychometric assessment: Participants suggested that computerised assessments are the future of psychometric assessments. They are confident that the South African society will benefit from the integration of computerised assessment with other technology such as artificial intelligence as this could lead to better decision making.

Generates automated report: Participants indicated that the benefit of computerised assessments is that automated reports can be downloaded. This function supports the Industrial Psychology professional with report-writing.

Increases objectivity: Participants mentioned that computerised assessments limit the report writer's professional judgement to a certain extent, which is beneficial because it increases objectivity.

Reaches a wider audience: Participants indicated that a further benefit of computerised assessment is that their client base is not limited to South Africa only since they can assess candidates worldwide. This allows participants to broaden their client base seeing that geographical dispersion does not impact the process. This also means that they can assess more candidates in a shorter timeframe, allowing them to take on more work.

Quick turnaround time: Participants suggested that computerised assessment allows for a short turnaround time of decision making, as processes such as setting up the assessment, scoring, interpreting, reporting and feedback can be done faster.

Real-time report generation and reporting: Participants mentioned that computerised assessments allow them to obtain reports in real-time. This allows the Industrial Psychology professional to retrieve reports immediately, which then accelerates the speed at which decisions can be made.

Reduces the amount of administration: Some of the participants suggested that computerised assessments reduce the administration load. This is beneficial as it allows Industrial Psychology professionals to direct their energy towards more critical tasks.

Safe and secure online portal: The findings suggested that participants perceive computerised assessments beneficial due to its increased safety measures, as all the assessment data is stored digitally and the access to the online portals are restricted to the Industrial Psychology professional.

Suitable for mass-testing: Participants indicated that computerised assessments are beneficial in instances where they have to conduct bulk assessments.

Time-efficient: Participants mentioned that computerised assessments are less time-consuming; therefore they perceive it as a benefit.

User-friendly: Participants lastly indicated that computerised assessments are beneficial due to the user-friendliness thereof. They further suggested that it allows candidates to complete the assessment when and where it suits them.

Table 6

Potential benefits associated with the use of paper-and-pencil assessment

Potential benefits – Paper-and-pencil assessment	
Theme	Response
Controlled supervision	“...If the candidates have any uncertainties, you are there to assist...” “...Supervised and the ability to answer any questions that the candidate might have during the completion.” “The assessor has the most control over the environment and the candidate.”
Cost-effective	“...It is the most cost-effective for the organisation.” “...This option allows me to give my clients a better rate on their assessments.” “It is a cost-effective method...”
Familiar to stakeholders	“These types of assessments are the most common and well-known to me.” “Paper-and-pencil is familiar to most individuals and seems to create the least amount of stress in candidates.”
No need for computers	“...Can be administered without using a computer.” “No access to computers necessary...” “Can be used when access to computers are an issue.”
Provide learning opportunity	“I learn the assessment better and how to analyse the results and write the report from scratch.” “As I’m still a junior Psychometrist with limited experience, I feel it helps me learn and understand a specific assessment better and how to write the report.”
Reliable	“Reliable, tangible, don’t fail on you!” “...They don’t fail on you...”

Suitable for candidates with lower levels of computer literacy	<i>"Helps with people who are not computer literate (older generation). However, this is becoming less and less of a problem."</i> <i>"...For people who are not computer literate this may be preferable as it minimises the anxiety around the technology."</i> <i>"It might be an easier method for certain individuals such as individuals who come from a rural or disadvantaged background."</i>
Suitable for mass-testing	<i>"...Can assess larger groups..."</i> <i>"...Convenient for mass-testing."</i>
User-friendly	<i>"Easy for most people to understand and very simple to complete."</i> <i>"...More people are comfortable using this mode (more straightforward)."</i> <i>"...For me, they are easy to use and administer..."</i>

Table 6 indicates benefits associated with the use of paper-and-pencil assessments. Quotes were also provided to indicate the responses associated with the themes. A discussion follows below on the themes:

Controlled supervision: Participants mentioned that a benefit of paper-and-pencil assessments is that the Industrial Psychology professional can supervise the candidate. This means that the professional can identify any irregularities and immediately attend to any questions and uncertainties the candidate has about the assessment.

Cost-effective: Some of the participants suggested that the benefit of paper-and-pencil assessments is the cost-effectiveness thereof. This allows the Industrial Psychology professional to assess the candidate at a cheaper rate.

Familiar to stakeholders: Participants mentioned that the benefit of paper-and-pencil assessments is that it reduces the stress for candidates, seeing that most people are familiar with this mode.

No need for computers: Participants further indicated that paper-and-pencil assessments do not require computers or any other technology for completion, which means that more candidates can complete the assessments.

Provide learning opportunity: Participants indicated that when writing reports on paper-and-pencil assessments, they are afforded an opportunity to learn and further enhance their

analysing and report-writing skills. They further indicated that this mode helps junior professionals in learning critical skills during the report-writing phase.

Reliable: Participants mentioned that paper-and-pencil assessments are tangible and dependable, and it holds little likelihood of failing the professional.

Suitable for candidates with lower levels of computer literacy: The findings indicate that participants believe that paper-and-pencil assessments are beneficial for using it on candidates who have lower levels of computer literacy, as this decreases anxiety levels. They further made specific reference to the ‘older generation’ and individuals from disadvantaged backgrounds.

Suitable for mass-testing: Participants mentioned that paper-and-pencil assessments are beneficial for testing large groups of candidates.

User-friendly: Some of the participants indicated that paper-and-pencil assessments are beneficial due to the user-friendliness thereof. They further suggested that this mode is easy to administer, and most candidates find it understandable and straightforward.

Table 7

Potential benefits associated with the use of gamified assessment

Potential benefits – gamified assessment	
Theme	Response
Automated scoring	“...Manual scoring is usually not required (depending on the test)...” “...Automated scoring processes...”
Candidate engagement	“It sparks the interest of individuals. Candidates are more willing to complete...” “...It is great for graduate recruitment as it sparks interest with the younger generation.” “...People doing gamified assessments will be more engaged and less distracted, because the assessment is the ‘distraction’...”
Further and deeper testing of traits	“...Measures deeper understanding through skill and ability. It is also able to measure performance and not only knowledge.” “...New, interesting theories or methodologies underpinning the constructs they are measuring.”
Future of psychometric assessment	“...Modern, innovative.” “...Gamification - it’s the future of assessments...” “...In time I think I might use this as this is the future of assessments...”

User-friendly	<i>"Quick, efficient, and easy to set up and use..."</i> <i>"Quick to administer, work well if used for purpose for which they are designed."</i> <i>"...It allows for remote assessment administration, automated scoring processes, a centralised assessment platform..."</i>
Potential	<i>"I do believe that it has eminence potential and as I grow in the industry I would like to explore these assessments in full..."</i> <i>"It opens the assessment market to further and more extensively assess desirable traits and abilities."</i>
Higher face-validity	<i>"...I do believe the use of gamified testing is very effective and "attractive" to companies and employees being assessed."</i> <i>"...Face-validity is very important and need SA gamification for SA context."</i>
Situational simulations	<i>"This allows for assessment in a more abstract or situational based environment..."</i> <i>"...Gamification also help professionals to assess behaviourally-based constructs such as entrepreneurship by simulating a game where the candidate needs to invest in buying, selling stock and property."</i>

Table 7 indicates benefits associated with the use of gamified assessments. Quotes were also provided to indicate the responses associated with the themes. A discussion on the themes follows below:

Automated scoring: The participants mentioned that the benefit of gamified assessments could be found in the automated scoring processes associated with this assessment mode.

Candidate engagement: Some of the participants indicated that candidate engagement is one of the benefits of gamified assessments. It stimulates the candidates' interest and increases their willingness to complete the assessments. They further made specific mention of the younger generation that finds gamified assessments engaging.

Further and deeper testing of traits: The findings suggest that participants believe that gamified assessments are beneficial due to the underpinning theory and its ability to measure deeper constructs such as performance.

Future of psychometric assessment: Participants mentioned that a benefit of gamified assessments is that it is modern, innovative, and will form the future of psychometric assessment.

User-friendly: Participants indicated that gamified assessments are user-friendly because it is efficient in setting it up, administering the assessment, scoring and report-writing; therefore they perceive this assessment mode to be beneficial.

Potential: Some participants suggested that gamified assessment is of benefit to the industry, seeing that it expands the assessment market, and they believe that this assessment mode holds loads of potential in the assessment arena.

Higher face-validity: Participants mentioned that gamified assessments present higher face-validity since companies and candidates find it attractive.

Situational simulations: The participants indicated a further benefit of gamified assessments, namely that it can simulate a particular environment and assess the candidate's behaviour within that specific context.

Category 4: Potential challenges associated with the use of different modes of psychometric assessment

In this category participants were requested to indicate the potential challenges associated with the use of different modes of psychometric assessment. The responses are presented in Tables 8, 9 and 10 below.

Table 8

Potential challenges associated with the use of computerised assessment

Potential challenges – Computerised assessment	
Theme	Response
Difficult to control test conditions	<i>"...Little control over the test environment."</i>
	<i>"Computerized testing encourages unsupervised testing conditions and often that can be challenging to ensure the correct test conditions are created for optimal assessments."</i>
	<i>"The physical environment during completion can affect their results if they get disrupted."</i>
Difficult to supervise candidates	<i>"...Difficult to supervise..."</i>
	<i>"If there were any uncertainties from the candidate's side, you as an administrator aren't near to assist."</i>
	<i>"...Sometimes admin can be a problem if the participant does not understand"</i>

	<i>instructions.”</i>
Expensive	<i>“...Online assessment test distributors are expensive with their training...”</i> <i>“Certain tools are more expensive to use online.”</i> <i>“It can be expensive to utilise computerised assessments.”</i>
Generic automated report	<i>“...The computer-generated reports are generic and is not written well enough to be used for reporting.”</i> <i>“...The automated reports lack interpretative report-writing...”</i>
Not suitable for candidates who do not have access to computers	<i>“...The distribution of technology is not conducive to a fair opportunity for all SA citizens.”</i> <i>“In SA I feel it can sometimes be difficult as a lot of people don’t have access to computers...”</i>
Not suitable for candidates with low computer literacy	<i>“People who are not computer literate struggle to navigate the assessments.”</i> <i>“There are still a lot of people who are not comfortable working with a computer, keyboard and track-pad/mouse. This can impact results and may not be a true reflection of a candidate due to their distress.”</i> <i>“Challenges include computer illiteracy for those in lower-level positions.”</i>
Not user-friendly	<i>“The challenge is mostly related to the use of the assessment platforms and computer system requirements.”</i> <i>“...Not always user-interface friendly...”</i>
Technical challenges	<i>“...Often requires a lot of troubleshooting...”</i> <i>“Candidates experience technical difficulties with online assessments, and it can be frustrating to communicate remotely when assisting them.”</i> <i>“...There are often issues with technical challenges; there is also the added stress of ensuring your client is fine.”</i>
Unpredictability of electricity and internet connection	<i>“Load shedding - specifically in South Africa. Poor internet connection can also affect the assessment experience...”</i> <i>“...Requires good internet and power. If any of these two factors are absent it can disrupt the assessment.”</i> <i>“Load shedding poses a great challenge, if the company does not have generators and only desktops thus assessments can be interrupted or influence the saving of information.”</i>

Table 8 indicates potential challenges associated with the use of computerised assessments. Quotes were also provided to indicate the responses associated with the themes. A discussion on the themes follows below:

Difficult to control test conditions: Participants indicated that a challenge associated with computerised assessments is that the Industrial Psychology professional has limited control over the test conditions as it is up to the candidate to follow the guidelines provided.

Difficult to supervise candidates: Participants mentioned that they find computerised assessment challenging because it makes it difficult for the Industrial Psychology professional to intervene when they require support.

Expensive: Some of the participants suggested that computerised assessments are costly to purchase from test publishers. A further challenge indicated by the participants is that training is expensive.

Generic automated report: Participants also indicated that a challenge associated with computerised assessments is that the automated reports are too generic, they lack interpretation, and are not tailored specifically for the candidate.

Not suitable for candidates who do not have access to computers: A further challenge of computerised assessments indicated by the participants is the unequal distribution of technology in South Africa, making it impossible to accommodate all candidates in this assessment mode.

Not suitable for candidates presenting lower computer literacy: Participants suggested that they find it challenging to use computerised assessments on candidates presenting lower computer literacy as they struggle to navigate the assessments, which then impacts their results negatively.

Not user-friendly: Some participants also mentioned that it is challenging to use the assessment platforms of the computerised assessments, and systems requirements are a further challenge causing this assessment mode to be less user-friendly.

Technical challenges: Participants indicated that a few technical challenges are associated with computerised assessments. These challenges cause unnecessary stress for the candidate, and in the case where the professional needs to assist the candidate remotely it can also cause frustration.

Unpredictability of electricity and internet connection: Participants suggested that a further challenge with the use of computerised assessments is load-shedding, which is a growing

concern in South Africa, coupled with poor internet connection. This causes disruption in the assessments and would mean that candidates need to redo the assessments.

Table 9

Potential challenges associated with the use of paper-and-pencil assessment

Potential challenges –Paper-and-pencil assessment	
Theme	Response
Extensive administrative process	<i>"It is a lot of admin that needs to be managed and maintained..."</i> <i>"...There is a big administrative burden involved."</i> <i>"It requires a lot of manpower with the relation to the administration and scoring..."</i>
Inconvenient	<i>"At this stage it's difficult to get to people and assess them with paper-and-pencil tests, we have a lot of people on client site, so they either have to take time off there and go to the head office or take the assessment after work or over weekends, which is not ideal."</i> <i>"To find the time that is convenient for the candidate and the assessor."</i>
Increased possibility of missing responses	<i>"It is very possible for candidates to miss on answering all of the questions given - thus impacting on the scoring and interpretation."</i> <i>"Some questions can accidentally be skipped or missed."</i>
Need for physical storage space	<i>"Record-keeping and storage of these assessments takes up a lot of space."</i> <i>"More space and materials required to complete such as, paper, pencil, pen and any other required material."</i>
Obsolete	<i>"...It is also old fashioned and can therefore harm the image of a 'new age' company."</i> <i>"Can sometimes seem to be less modern / outdated in a world that is technology driven."</i> <i>"...Some assessments can look old, and outdated. I feel it can create the impression that you are not keeping up with advancements..."</i>
Requires administrator to be physically present	<i>"...To be there with the candidate in-person, which is not possible with international candidates specifically."</i> <i>"Location specific - cannot assess remotely."</i> <i>"...You need to be there with the candidate in-person for the administration which currently poses to be a challenge."</i>
Susceptible to human error	<i>"Scoring that is more subjected to human error. Increased chance of human error."</i> <i>"More room for human error when scoring, and even when candidate is responding to the different questions."</i>
Tedious	<i>"It can be tedious at times to hand score."</i> <i>"Personally, I don't like it because it is a lot more tedious than computerised assessments."</i> <i>"...The marking can at times be tedious."</i>
Time-consuming	<i>"Unfortunately it's very time consuming."</i> <i>"...Scoring also takes very long and is a time-consuming job."</i>

	<i>"More time-consuming for report-writing and scoring..."</i>
Unpleasant experience	<i>"...I don't enjoy making use of this method."</i> <i>"...The administration and scoring thereof, however, it is something that makes it less pleasurable for me."</i>
Unsafe storage	<i>"...Ensuring the safety of the assessments because it is less secure than digital records."</i> <i>"Less secure in terms of booklets or files that may go missing, etc..."</i> <i>"The security and safekeeping of documents holds a bigger risk than computer-based assessments."</i>

Table 9 indicates potential challenges associated with the use of paper-and-pencil assessments. Quotes were also provided to indicate the responses associated with the themes. A discussion on the themes follows below:

Extensive administrative process: The participants indicated that one challenge associated with paper-and-pencil assessment is the comprehensive administration required such as setting up the assessments, manual administration, scoring and report-writing.

Inconvenient: Some participants mentioned that it is difficult to accommodate candidates' schedules, and for them to take time off at work to complete the assessment is an inconvenience.

Increased possibility of missing responses: Participants suggested that a further challenge with paper-and-pencil assessments is the increased likelihood of test-takers missing responses, directly impacting the assessment results.

Need for physical storage space: Participants mentioned that a challenge with paper-and-pencil assessments is storage and record-keeping which means that the Industrial Psychology professional would require a dedicated space to store all the assessment material and results.

Obsolete: Some of the participants indicated that paper-and-pencil assessments are outdated. The challenge is that it could cause reputational damage for a company to use an obsolete assessment method in a technology-driven era.

Requires administrator to be physically present: Participants further suggested that paper-and-pencil assessments pose the challenge that the Industrial Psychology professional needs to be physically present while the candidate is completing the assessment.

Susceptible to human error: The findings indicate that participants believe that paper-and-pencil assessments are more susceptible to human error, especially when scoring the assessment, and that it creates a challenge to maintain high levels of accuracy.

Tedious: Participants indicated that paper-and-pencil assessments are tedious due to the manual scoring process.

Time-consuming: The participants mentioned that the activities involved in paper-and-pencil assessments such as scoring, and report-writing are time-consuming and pose a challenge to Industrial Psychology professionals.

Unpleasant experience: Some participants suggested that the use of paper-and-pencil assessments is an unpleasant experience for them; hence they perceive it as a challenge.

Unsafe storage: The findings suggest that safekeeping is a challenge for the participants as assessment results and material could easily go missing. This could have detrimental effects, seeing that the nature of the psychometric assessment process is highly confidential.

Table 10

Potential challenges associated with the use of gamified assessment

Potential challenges – Gamified assessment	
Theme	Response
Difficult for candidates who dislike playing games	<i>“Not many people like gamified assessments. Older candidates might not have a good experience.”</i> <i>“Not everyone responds to using games. Maybe they think it is silly.”</i>
Lack of face-validity	<i>“...Sometimes face-validity is impacted. Namely, how does this game relate to how I perform at work?”</i> <i>“Gamified assessments do not always seem appropriate for all candidates, especially on higher organisational levels.”</i>
Not knowledgeable about this mode of assessment	<i>“The methodology of gamified assessments is often questioned.”</i> <i>“It has not been tried-and-tested as much as paper-based assessments and computerised assessments, making me question the validity sometimes.”</i>

	<i>"...I am sceptical..."</i>
Not suitable for candidates presenting lower computer literacy	<i>"May not be a pleasurable experience for people who are not computer-literate or perhaps older age groups."</i> <i>"...Computer illiteracy..."</i>
Stressful for candidates	<i>"...Can be stressful for the candidate."</i> <i>"People sometimes find these assessments quite stressful or overwhelming people, because they are not 100% certain of their answers and what is being measured in the moment."</i>
Unpredictability of electricity and internet connection	<i>"Load shedding, poor internet connection..."</i> <i>"...Some tools are designed overseas, and when they come here they struggle with the fact that our internet is just not as stable or capable as overseas. So tests hang, times incorrectly and kick you out."</i>
Technical challenges	<i>"Gamified assessments also may have sound involved, and problems can occur if the candidate does not have all settings in order on their computer."</i> <i>"...This includes dealing with technical problems..."</i>

Table 10 indicates potential challenges associated with the use of gamified assessments. Quotes were also provided to indicate the responses associated with the themes. A discussion on the themes follows below:

Difficult for candidates who dislike playing games: The participants indicated that candidates who dislike games in general might find it challenging to complete gamified assessments. Specific reference was also made to older candidates.

Lack of face-validity: Some participants suggested that a challenge associated with gamified assessments is the lack of face-validity seeing that candidates struggle to make the association between the 'game' and work performance. Specific mention was also made that gamified assessments may be perceived as inappropriate to use on higher-level positions.

Not knowledgeable about this mode of assessment: Participants mentioned that a challenge with gamified assessment is that they are not knowledgeable about this assessment mode; therefore they experience scepticism and question the methodology and validity of gamified assessments.

Not suitable for candidates presenting lower computer literacy: Participants further indicated that a challenge in gamified assessment is that candidates presenting lower computer literacy

levels may be uncomfortable with this assessment mode, especially candidates in older age groups.

Stressful for candidates: The participants mentioned that a further challenge with gamified assessments is that candidates are uncertain of what the assessment measures and this increases their stress levels during the assessment.

Unpredictability of electricity and internet connection: Participants suggested that the unpredictability of electricity and internet connection poses a challenge for gamified assessment, seeing that South Africa is often confronted with load shedding. The participants further indicated that gamified assessments developed in other countries create technical difficulties due to unstable internet connection in South Africa.

Technical challenges: Lastly, participants mentioned that they experience technical challenges with gamified assessments such as sound settings, which negatively impact the assessment results.

Category 5: Recommendations made by Industrial Psychology professionals to enhance the use of psychometric assessment

In this category participants were requested to make recommendations for enhancing the use of psychometric assessment. The responses are presented in Table 11 below.

Table 11

Recommendations made by Industrial Psychology professionals for enhancing the use of psychometric assessment

Recommendations made by Industrial Psychology professionals for enhancing the use of psychometric assessment	
Theme	Response
All assessments should be standardised for the South African context	<i>"...All assessments to be standardised against the South African population..."</i> <i>"There is a lot of improvement needed in the simulations and customisation of computerised assessments in South Africa."</i>
Competent practitioners	<i>"...Make sure that you are competent in the assessments you use - attend refreshers if needed."</i> <i>"...We as Psychometrists and Industrial Psychologists have a personal responsibility to stay updated with the latest developments in the industry and to</i>

	<i>suggest and promote these psychometric assessments in our companies.”</i>
Create a non-threatening environment for the candidate	<i>“I would still encourage that emphasis is placed on creating the most suitable test conditions. So whatever approach you use, the comfort and stress levels of the individual being assessed are key.”</i> <i>“Create an environment which is comfortable and non-threatening to the client.”</i> <i>“...Practitioners who work with psychometrics daily must remember that it is a stressful experience for a candidate and even though you work with it daily it is new to them.”</i>
Familiarising stakeholders with the assessment process	<i>“I think we should share more information on assessments, how they work, why do we use them, the test taker rights and responsibilities.”</i> <i>“To broaden individuals’ knowledge on this topic, and to make them aware of all the benefits that psychometric assessments can have for them. How it can improve their lives. Try to get the message across more regularly.”</i> <i>“Educating learners and parents more about psychometric assessments as not many people understand what they are about.”</i>
Focus on the value-add of assessments	<i>“A bigger focus on return on investment, companies want to see whether this is costing or saving me money...”</i> <i>“...Suggest and promote these psychometric assessments in our companies, especially in companies that does not make use or see any value in psychometric assessments.”</i> <i>“Clients need to understand the value of using assessments during organisational processes better.”</i>
Strong focus on ethics	<i>“Practitioners should use the assessments in an ethical way...”</i> <i>“Consistent and fair administration.”</i> <i>“Ensure they are classified and have good properties. Lots of poor assessments out there are being used, and lots of psychometric assessments are being used by non-certified practitioners.”</i>
Higher education institutions should provide quality and comprehensive training to practitioners	<i>“I think Psychometrists need more in-depth training in using different these different mode, and the challenges and advantages it can have, during their studies or intern-period. Perhaps a longer internship (e.g. a full year) with a more comprehensive program that includes focusing on different modes...”</i> <i>“Better training at universities on the future requirements of assessment practitioners - data analytics training, coding etc.; and training in how to work with AI in assessments.”</i> <i>“I would suggest increasing the exposure students get to different types of assessments.”</i>
Refrain from using a one-size-fits-all approach	<i>“...Don't implement a one size-fits-all approach to projects. Tailor the assessment process based on the outline and needs of the project and adapt your mode of psychometric assessment accordingly...”</i> <i>“Psychometrists and Industrial Psychologists should select the assessment batteries and tools based on the purpose of assessment and not necessarily always recommend their 'normal' battery to all assessment processes or clients.”</i>
Regular updating of norm groups	<i>“Norm groups to be updated more regularly...”</i> <i>“...Continuously improve on norms...”</i>

Test publishers and distributors should consider pricing structure	<i>“Online assessment developers and distributors should consider the smaller recruiter and professional business in their pricing as the training and assessment use is very expensive and not always available for smaller businesses.”</i> <i>“Assessments need to be less expensive to buy for Industrial Psychologist as the real value lies in the interpretation and feedback. If less expensive for us, more clients might consider using it...”</i> <i>“Training for a lot of assessments are very expensive and for psychometrists that are just starting out, it is hard to afford the training if something can be done about the cost of training more people would, in my opinion, attend more training.”</i>
Test publishers and distributors should keep platforms updated	<i>“Some online psychometric houses need to upgrade their platforms - often their portals are so old and not user-friendly.”</i> <i>“My recommendation to the profession overall is to continuously improve on norms, assessment platforms to ensure clients and candidates find it user-friendly creating a positive assessment process.”</i>

Table 11 indicates recommendations for enhancing the use of psychometric assessment. Quotes were also provided to indicate the responses associated with the themes. A discussion on the themes follows below:

All assessments should be standardised for the South African context: Participants mentioned that assessments specific to the South African context should be developed or adapted and that improvement is necessary in this area.

Competent practitioners: Participants suggested that Industrial Psychology professionals could ensure their competence by keeping themselves updated with the latest developments in the industry and attend refresher training courses.

Create a non-threatening environment for the candidate: Participants indicated that Industrial Psychology professionals could create non-threatening test environments for candidates by focusing more on appropriate test conditions and candidate stress-levels. They further suggested that professionals should bear in mind that the completion of psychometric assessments could often be a daunting experience for candidates and that bringing in the human element would put them at ease.

Familiarising stakeholders with the assessment process: Participants mentioned that stakeholders (i.e. candidates, organisations and parents) should be made knowledgeable about

psychometric assessment-related information such as the purposes, the process, benefits and test taker rights and responsibilities.

Focus on the value-add of assessments: Some participants indicated that Industrial Psychology professionals should direct their energy toward showing the value-add of assessments. They further mentioned that organisations are interested in return on investment.

Strong focus on ethics: Participants recommended that Industrial Psychology professionals attend to the basic ethical principles in assessments such as ensuring assessments included in their batteries are classified, consistent and administered fairly, and ensuring that irregularities such as non-certified practitioners are reported.

Higher education institutions should provide quality and comprehensive training to practitioners: Participants suggested that attention should be given to Industrial Psychology University programmes and curriculums to ensure in-depth training and exposure to all the different assessment modes. They further recommend that the psychometric internship of six months be extended to one year, coupled with a more comprehensive program that includes all the assessment modes. Participants also mentioned that the future world of work requirements should be covered on university level, such as data analytics training, coding and working with artificial intelligence.

Refrain from using a one-size-fits-all approach: Some participants mentioned that Industrial Psychology professionals should avoid using a one-size-fits-all approach and rather customise assessment batteries and the process to the specific needs of the project.

Regular updating of norm groups: Participants suggested that test publishers should regularly update the norms group of the various assessments to ensure proper use within the South African context.

Test publisher and distributors should consider pricing structures: The participants suggested that test publishers should take small businesses and newly qualified professionals into consideration when determining assessment and training prices since it is unaffordable in some cases. Participants further mentioned that the actual value of an assessment is obtained

in the interpretation and feedback stage; Industrial Psychology professionals should be able to access these assessments at a fair price.

Test publishers and distributors should keep platforms updated: Participants indicated that test publishers should upgrade and update their online platforms frequently to ensure it remains user-friendly for both the professional and the candidate seeing that this impacts the overall assessment experience.

DISCUSSION

Outline of the findings

The *first objective* of this study was to conceptualise paper-and-pencil, computerised and gamified psychometric assessments according to literature. The term *psychometric assessment* is defined as an assessment aiming to comprehend behavioural constructs to guide decision-making for individuals, groups and organisations (Foxcroft & Modack, 2018). The International Test Commission (2014) indicated that psychometric assessments are often used in high-stake situations such as educational settings, obtaining employment, promotion, and in the legal context.

Lubbe and Nel (2012) defined *paper-and-pencil psychometric assessments* as an assessment mode that requires the candidate to answer a set of questions, which could be referred to as a ‘stimulus’; thus the candidate responds to the questions on paper. In this instance, no technology is used to complete the assessment. Foxcroft and Modack (2018) suggested that paper-and-pencil assessments were originally used to assess candidates prior to the development of computer technology; it is also referred to as the traditional mode of assessment.

Tredoux (2013) described *computerised psychometric assessments* as an assessment mode that uses technology in the administration, scoring or report-writing phase of the assessment. Tredoux (2013) further emphasised that the extent to which technology is used for these assessment activities differs depending on the assessment tool. Macqueen et al. (2018) suggested that computerised assessments are mostly applied in organisational and educational

settings. Georgiou and Nikolaou (2020) referred to *gamified psychometric assessments* as an assessment mode in which game elements are added to existing psychometric assessments to achieve higher candidate engagement levels. Gamified psychometric assessments are most commonly used in organisations to attract, select and retain employees in learning and development (Cut-e Group, 2017).

The *second objective* of the study was to explore the purposes for which Industrial Psychology professionals use the different modes of psychometric assessment. Participants indicated that they use psychometric assessments for purposes of career guidance, development, employee wellness, learnerships and bursaries, medico-legal reports, mentoring and coaching, organisational climate and culture, performance management and recruitment and selection. Participants suggested that psychometric assessments are useful for career guidance purposes. Khatub (2016) also pointed out that psychometric assessments are particularly used to assess the candidate's career interest and aptitude in a career guidance setting. However, Watson and McMahon (2013) recommended that assessment in the current world of work should make accommodation for qualitative approaches such as exploration and contextualization, without relying on quantitative measures such as psychometric assessments. This means that effective career decisions can be made, taking into consideration a broad spectrum of qualitative factors, such as the candidates.

A further theme that stood out was the use of psychometric assessments for recruitment and selection purposes. Research suggests that the main aim of using assessments for selection purposes is to alleviate potential risk to the organisation by predicting whether the desired outcomes can be achieved (Psytech International, 2021). Dattner (2013) argued that a significant number of organisations do not use assessments appropriately in the recruitment and selection context, which raises legal concerns in terms of fairness. It therefore is crucial to ensure that assessments are used for the purposes it was intended. Participants mentioned that they use psychometric assessments for medico-legal reports. However, Cartwright (2018) suggested that the inclusion of psychometric assessments in this setting is merely used to support decision-making and it is not compulsory. The afore-mentioned researcher also recommended the inclusion of psychometric assessments in the process, since it can complement current approaches.

Participants further indicated the use of assessments for development purposes. De Witt (2020) indicated that psychometrics for development purposes are usually applied to the current workforce to provide insight into the construction of their personal development plans (PDPs) which aim to enhance their strengths and address development areas. Gopalakrishnan et al. (2017) suggested that in a development context psychometric assessments are particularly useful for team profiling. By doing so team members can increase the understanding of one another, which means that the team can grow and develop.

The *third objective* of the study was to explore the different modes of psychometric assessment used by Industrial Psychology professionals. The participants in this study indicated that they utilise different modes of psychometric assessment for various reasons.

Participants mentioned that they use computerised assessments because it allows them to comply with COVID-19 regulations, since they can conduct assessments remotely. Research suggests that the COVID-19 pandemic will significantly contribute to the increased use of computerised and online assessments (Jivan et al., 2020). This means that the shift to technology in assessment practices will increase considerably. Participants also pointed out that the use of computerised assessment reduces the amount of administration as automated scoring is performed. However, Tredoux (2013) is of the opinion that Industrial Psychology professionals should still apply their minds when using computerised assessment modes because the likelihood of errors to creep in still exists. On the contrary, participants questioned the reliability of computerised assessments due to the reliance of this mode on electricity and internet connection. Participants further mentioned that this is a growing concern, taking into consideration the amount of load shedding that occurs in South Africa.

The participants indicated that they prefer to utilise paper-and-pencil assessments because it is cost-effective; it is suitable for candidates with lower levels of computer literacy; it is suitable for mass-testing; and it is suitable for candidates without access to computers. The participants also suggested that they use gamified assessments due to the suitability thereof for younger candidates; others indicated that they are not knowledgeable about this new mode of assessment. Participants indicated that they use paper-and-pencil assessments because it is cost-effective; it is suitable for candidates with lower levels of computer literacy; it is suitable for mass-testing; and it is suitable for candidates without access to computers. Participants mentioned that they utilise paper-and-pencil assessments due to the cost-

effectiveness thereof. On the contrary, Pulakos and Kantrowitz (2016) suggested that technology has decreased the cost of assessment modes because it has eliminated the material and equipment needed to administer and score paper-and-pencil assessments. Participants supported this notion as they suggested that they refrain from using paper-and-pencil assessments due to the increased susceptibility for human error. These differences could indicate possible misperceptions in the market regarding the paper-and-pencil administration mode. A further sub-theme that stood out was the use of paper-and-pencil assessments in the case where the candidate presents low levels of computer literacy. Lubbe and Nel (2012) pointed out that paper-and-pencil assessments remain the most suitable alternative to use for individuals with low computer literacy. By applying the alternative means that the candidate's test performance would not be negatively impacted.

Some participants mentioned that they use gamified assessments because it is suitable to use on candidates who are younger in age. They also suggested that they are not knowledgeable about this new mode of assessment. Participants indicated that they use gamified assessments due to the suitability thereof for younger candidates. Akoodie (2020) indicated that gamified assessments are used on school children to perform cognitive assessments. Research further supports this idea by suggesting that gamified assessments are instrumental in the recruitment setting to select young graduates (Nikolaou et al., 2018). However, Armstrong et al. (2016) mentioned that if gamification is used in a selection context it could potentially raise concerns regarding procedural fairness seeing that candidates who have had exposure to games would likely react more positively to the assessment than would candidates who have not previously been exposed to games and might perceive the assessment to be unfair.

Armstrong et al. (2016) suggested that Industrial Psychology professionals often misunderstand the application of gamification in assessment settings. These researchers further attributed these misconceptions to a lack of empirical research and literature in gamified assessments. This was supported in the current research study since various participants pointed out that they are not knowledgeable about gamified assessments seeing that it is a new administration mode; therefore the result is non-utilisation of this assessment mode.

The *fourth objective* of the study was to explore the potential benefits associated with the use of different modes of psychometric assessment. The participants mentioned that benefits

associated with computerised assessments are: accessibility to multiple assessments on one portal; it allows for an integrated competency report-writing system; allows for remote administration; automated scoring; compliance with Covid-19 regulations; decreased possibility of missing responses; eliminates human error; enjoyable experience; future of psychometric assessment; generates automated report; increases objectivity; reaches a wider audience; quick turnaround time; real-time report generation and reporting; reduces the amount of administration; safe and secure online portal; suitable for mass-testing; time-efficient and user-friendly.

Participants indicated that a benefit of using computerised assessments is that it allows for remote administration, making it more convenient for both the Industrial Psychology professional and the candidate. These observations of the participants were supported by Luxton et al. (2014) who suggested that technology enables professionals to administer assessments online, which offers convenience and cost-saving seeing that no travel is involved. However, the afore-mentioned researcher also argued that computerised assessments that are administered online, limit the professional in the sense that behavioural observations cannot be made regarding non-verbal responses (Luxton et al., 2014). Participants also mentioned that computerised assessments are a benefit as scoring is automated, which saves a huge amount of time for the Industrial Psychology professional. Parakh et al. (2014) suggested that computerised assessment makes use of software that scores the assessments. This means that the professional can rather focus on the interpretation of the results. However, Tredoux (2013) mentioned that even though computerised assessments are beneficial during the scoring phase, the likelihood of mistakes being made still exists, and automation does not entirely eliminate errors. Thus the Industrial Psychology professional should take the necessary steps to ensure the accuracy of results.

Participants pointed out the following benefits associated with paper-and-pencil assessments: controlled supervision, cost-effectiveness, familiar to stakeholders, no need for computers, provide learning opportunity, reliable, suitable for candidates with lower levels of computer literacy, suitable for mass-testing and it is user-friendly. Participants indicated that the benefit of paper-and-pencil assessments is that controlled supervision is possible as this assessment mode means that the Industrial Psychology professional is physically present. Le Corff et al. (2017) argued that proctored paper-and-pencil assessment allows for higher standardisation levels, seeing that the Industrial Psychology professional can control the test environment.

However, Hinton and Stevens-Gill (2016) suggested that controlled supervision limits the number of candidates who can be assessed, and in a selection context it would mean that psychometric assessments would only be viable to use at the end stages of the recruitment cycle.

Participants indicated that paper-and-pencil assessments are beneficial because it could be administered to a large group of candidates. SIOP (2021) supports this idea by stating that an advantage of paper-and-pencil-based cognitive assessments is that it allows for administration to large groups. In addition, participants suggested further benefits of paper-and-pencil assessments, namely that no computers are required in this assessment mode and it can be applied on candidates who present low computer literacy levels. This mode is particularly relevant to South Africa, seeing that paper-and-pencil assessments allow Industrial Psychology professionals to serve a large portion of the population that does not have access to technology. Soko (2020) mentioned that South Africa's fourth industrial revolution is restricted by lack of both computer literacy and access to computers, seeing that an estimate of 10% of South Africans have personal computers at their disposal. This is further supported by Statista (2021) reporting that in 2020 an estimate of 56,3% of the South African population used the internet. Thus Industrial Psychology professionals cannot assume computer literacy or access to computers and will need to be consciously aware of when to rather make use of paper-and-pencil assessments.

Participants indicated the following benefits associated with gamified assessments: automated scoring; candidate engagement; further and deeper testing of traits; future of psychometric assessment; it is user-friendly; it shows potential; higher face-validity; and it allows for situational simulations. Participants further mentioned that a benefit associated with gamified assessment is that higher candidate engagement levels can be obtained. Nikolaou and Georgiou (2018) also suggested that gamified assessments allow for assessment-related information to be gathered while creating candidate engagement and attraction. However, Akoodie (2020) indicated that gamified assessments would only motivate candidates up to a certain point and could be perceived as manipulative. A further theme that stood out was that gamified assessments present higher face-validity. Research suggests that face-validity could be experienced differently by different individuals. Ellison et al. (2020) found that the face-validity of gamified assessments was higher for individuals who are comfortable with gaming than for those who were not. Feddersen and Kirsten (2010)

pointed out that the face-validity of a gamified assessment is compromised the moment a candidate no longer sees the relevance of the assessment or finds it difficult to perceive test fairness.

The *fifth objective* was to explore the potential challenges associated with using different modes of psychometric assessment. The participants indicated the following challenges associated with computerised assessments: difficult to control test conditions; difficult to supervise candidates; expensive; generic automated report; not suitable for candidates who do not have access to computers; not suitable for candidates presenting lower computer literacy; not user-friendly; technical challenges; and unpredictability of electricity and internet connection. Participants suggested that a challenge with computerised assessments is that it is not suitable for candidates presenting lower computer literacy. Lubbe and Nel (2012) support this notion as the researchers indicated that computerised assessment could be inappropriate to use on candidates who are not familiar with computers. Hence alternative assessment modes should be utilised. However, Joubert and Kriek (2009) argued that there is increased availability of computer technology, implying that computer literacy is becoming less challenging. Participants further suggested that a challenge with computerised assessment is that the Industrial Psychology professional could find it difficult to control the test environment. Macqueen et al. (2018) also mentioned that a pitfall associated with computerised assessment is the limited control over test conditions.

The participants indicated the following challenges associated with paper-and-pencil assessments: extensive administrative process; inconvenient; increased possibility of missing responses; need for physical storage space; obsolete; requires administrator to be physically present; susceptible to human error; tedious; time-consuming; unpleasant experience; and unsafe storage. Some participants reported that a challenge with paper-and-pencil assessments is the extensive administrative process. Hinton and Stevens-Gill (2016) support the idea that scoring and processing the results of paper-and-pencil assessments can be labour-intensive, suggesting that with this assessment mode, the Industrial Psychology professional spends unnecessary time on processing assessment results. Participants further indicated that paper-and-pencil assessments are inconvenient, and it requires the administrator to be physically present. APA (2018) also stated that paper-and-pencil assessments imply that the test administrator needs to travel to a specific location, and this is not always viable. The participants mentioned that a challenge with paper-and-pencil

assessments is the increased susceptibility to human error. Tredoux (2013) supports this notion by indicating that the most common errors occur in the scoring phase where results need to be transferred and scoring masks are used incorrectly. The participants further mentioned that a challenge with paper-and-pencil assessments is that it is becoming obsolete. Maglione et al. (2020) also stated that the risk accompanying paper-and-pencil assessments is that it is obsolete and that it could raise potential concerns regarding the validity of the assessment.

The participants pointed out the following challenges associated with gamified assessments: difficult for candidates who dislike playing games; lack of face-validity; not knowledgeable about this mode of assessment; not suitable for candidates presenting lower computer literacy; stressful for candidates; unpredictability of electricity and internet connection; and technical challenges. Participants indicated that a challenge related to gamified assessments is that the Industrial Psychology professionals lack knowledge about this new assessment mode. Landers (2019) pointed out that Industrial Psychology professionals are not sufficiently trained in the latest technological advancements, which poses an existential threat to the profession. This suggests that test publishers should make an effort to educate existing professionals on gamified assessments and that training institutions should ensure that emerging Industrial Psychology professionals are adequately trained in gamified assessments. Participants further mentioned that gamified assessments are not suitable for candidates presenting lower computer literacy. Jivan et al. (2020) indicated that the digital divide and low levels of technology proficiency in South Africa highlight this issue even further because it could negatively impact the test results of disadvantaged candidates.

The *sixth objective* was to explore recommendations made by Industrial Psychology professionals to enhance the use of psychometric assessment. The participants recommended the following towards the enhancement of assessments: all assessments should be standardised for the South African context; competent practitioners; create a non-threatening environment for the candidate; familiarise stakeholders with the assessment process; focus on the value-add of assessments; strong focus on ethics; higher education institutions should provide quality and comprehensive training to practitioners; refrain from using a one-size-fits-all approach; regular updating of norm groups; test publishers and distributors should consider pricing structure; and test publishers and distributors should keep platforms updated. Participants recommended that test publishers and distributors should consider their pricing

structures to ensure the affordability of all modes of assessment and the appropriate training. This allows more organisations to use assessments, and smaller Industrial Psychology consulting companies to increase their profit margin. However, it raises concerns regarding the ethical use of assessments. Halcrow (2019) suggested that the high costs involved in purchasing assessments from test publishers results in Industrial Psychology professionals using low-cost options instead of ensuring high-quality assessment batteries. Participants mentioned that all assessments should be standardised for the South African context. Bernstein (2017) also indicated that if organisations ensure that they use standardised psychometric assessments, it does not only increase fairness, but also protects the organisation from a legal perspective. The participants further recommended that a need exists for the profession to increase ethical test use. De Bod (2011) suggested that increased awareness of ethical test use would mean that higher professionalism and quality standards could be achieved. Foxcroft (2011) indicated that the most important ethical consideration for Industrial Psychology professionals in the utilisation of assessments is to take all reasonable steps to ensure that no harm is done to a candidate. Participants recommended an increased focus on the value-add of assessments. Van Eeden (2017) supported this idea by stating that organisations should avoid assessments resulting in a tick-box approach, but rather use it in a way that it could add value. The researcher further indicated that the return-on-investment on the use of psychometric assessment is evident when culture-fit is achieved, self-insight is obtained, and recruitment for existing positions declines (Van Eeden, 2017).

The *seventh objective* was to make recommendations for future research and practice. This objective will be discussed in the ‘Limitations and recommendations’ section.

Practical implications

This study will create awareness amongst Industrial Psychology professionals to make properly-informed decisions regarding the use of different assessment modes, given the diverse context of South Africa. This study can further enable organisations to develop and adapt psychometric assessment policies suitable to the digital age. This study also holds the potential of providing test publishers with a snapshot timeously of the positive and negative factors regarding the various assessment modes, for them to align their efforts with the needs of Industrial Psychology professionals. It further provides test publishers with qualitative information related to assessments in the digital age, enabling them to provide services and

products better suited to Industrial Psychology professionals. This study could also assist the governing body, the Health Professions Council of South Africa (HPCSA), to future-proof assessment policies for it to remain relevant. This means that assessment policies should be reviewed and updated to ensure that it encapsulates best practices on the assessment practices for all the assessment modes (i.e. paper-and-pencil, computerised and gamified assessments).

Limitations and recommendations

Despite the insights provided in this study, certain limitations did exist and should be considered. The first identified limitation of the study can be found in the sample size of 21 participants (N=21). It should therefore be noted that the results of the study cannot be generalised. However, the overall objective of qualitative research is not to generalise results. The second limitation concerns the lack of diversity in this study, seeing that only white and coloured individuals participated. However, it should be considered that the study employed purposive and snowball sampling techniques. The researcher made use of online qualitative interviews and not face-to-face interviews, this meant that it was not possible to probe answers. However, the researcher requested in the survey that the participants provide detailed answers. Language could also be a limitation because the qualitative survey was only made available in English, which means that participants could have found it challenging to articulate themselves in their responses. However, one of the inclusion criteria was that the participants had to be proficient in English.

For future research, it is recommended that a larger sample size be used to collect data; this will broaden the perspectives of Industrial Psychology professionals on the different assessment modes. Furthermore, it is recommended that the sample of the study be representative of the Industrial Psychology profession by including more than two cultural groups to participate in the study. A further recommendation is to afford the participants the opportunity of completing the qualitative survey in the language of their choice as this would eliminate potential language barriers.

Recommendations could also be made for practice. Organisations can implement the findings of this research study by developing, updating and implementing psychometric assessment policies that encapsulate all the necessary factors such as test security, assessment mode appropriateness, contingency management, data storage etc. This would aid organisations in

aligning their current assessment practices with best practice standards. Furthermore, the organisation can use the findings to conduct a proper needs analysis prior to setting up assessment batteries. Industrial Psychology professionals should make a concerted effort to upskill themselves in the most recent technologically-advanced assessments. By doing this they will remain relevant and fit for practice. The findings can be used by Industrial Psychology professionals to inform decision-makers in organisations regarding the benefits and the possible return-on-investment as well as regarding the challenges related to the use of assessments.

Conclusion

In conclusion, the results of this study indicated that Industrial Psychology professionals prefer to use different modes of psychometric assessment for various reasons. The findings indicated that assessments are mainly utilised by Industrial Psychology professionals for recruitment and selection, career guidance and development purposes. The findings further provided rich information related to the benefits and challenges associated with paper-and-pencil, computerised and gamified assessments. It is clear that the majority of participants prefer using computerised assessments. The minority of participants indicated that they use gamified assessments. This could be ascribed to the limited knowledge of Industrial Psychology professionals concerning the gamified assessment mode. The participants also provided valuable recommendations as to how psychometric assessment can be enhanced.

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CHAPTER 3

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

The final chapter provides conclusions drawn from the findings discussed in the research article (Chapter 2). The conclusions are presented according to the general and specific objectives of the study. In addition, this chapter outlines the limitations and recommendations for future research and practice.

3.1 Conclusions

Objective 1: To conceptualise paper-and-pencil, computerised and gamified psychometric assessments according to literature.

The term *psychometrics* originated from the two concepts ‘mental’ and ‘measurement’ Maddocks (2019). Gopalakrishnan and Nidhi (2017) defined psychometrics as standardised and scientific techniques for measuring attitudes, personality traits, and cognition. Psychometric assessments aim to measure various constructs such as skills, knowledge, abilities, and behavioural characteristics so that awareness can be increased and informed decisions can be made (SHL, 2021). Crush (2015) suggested that the confidence in psychometric assessment is growing, while the polarised views are decreasing. This could mean that the usage of psychometrics can increase on individual, group and organisational level. This study aimed at exploring three different psychometric assessment modes, paper-and-pencil, computerised and gamified assessments.

Paper-and-pencil assessments can be defined as psychometric assessments administered face-to-face by using booklets and answer sheets (Hinton & Stevens-Gill, 2016). In literature, Paper-and-pencil assessments are often referred to as the traditional assessment (Vosylis et al., 2012). *Computerised assessments* can be defined as a technology-based assessment since it involves the candidate completing an assessment by using computer technology (Morelli et al., 2017). Armstrong et al. (2016) referred to *gamified assessments* as a psychometric assessment containing game elements to monitor assessment activities and progress, allowing for higher levels of candidate engagement.

Objective 2: To explore the purposes for which Industrial Psychology professionals use the different modes of psychometric assessment.

The study recorded that Industrial Psychology professionals use psychometric assessments for various purposes. Muralidharan (2020) also proposed that there are multiple applications to psychometric assessments in an organisational context, such as recruitment, training and development, organisational planning, performance evaluation and employee engagement. The findings of the research study indicated that the main purposes for which the participants use psychometric assessments are recruitment and selection, development and career guidance. Nikolaou and Oostrom (2015) suggested that psychometric assessments in the recruitment and selection context have become instrumental in the facilitation of decision-making. Baron et al. (2020) indicated that psychometric assessments are also useful for developing the existing employees and should be used as a starting point in development initiatives. Bemath (2020) also supported the idea of psychometric assessment for purposes of career guidance and counselling. The main aim of career guidance assessments is to determine a person-environment fit. However, Davis (2013) suggests that even though psychometric assessments have a number of different uses in the organisation, it is essential to remember that the primary purpose of assessing individuals and groups should be to reach a point of increased understanding and insight from the results.

Objective 3: To explore the different modes of psychometric assessments used by Industrial Psychology professionals.

In this study, the researcher explored the different modes of psychometric assessments used by Industrial Psychology professionals. Most participants indicated that they prefer to use computerised psychometric assessments. Hinton and Stevens-Gill (2016) stated that computerised psychometric assessment is the most relevant in the current world context, and this assessment mode will most likely replace traditional assessment modes. The participants indicated that the main reason for them to prefer using computerised assessment is that this mode allows for quick turnaround times. Hinton and Stevens-Gill (2016) also supported this notion and indicated that faster lead times could be attributed to automation. This means that this mode is less labour-intensive. However, the findings also suggest that some participants do not prefer to use computerised assessments due to the unpredictability of electricity and load shedding in South Africa. The findings further reported that participants prefer using

paper-and-pencil psychometric assessments because it is suitable for candidates who present lower levels of computer literacy. Foxcroft (2011) also suggested that it is best practice to use paper-and-pencil assessment on candidates who present lower literacy levels. However, the findings also indicate that participants prefer not to use paper-and-pencil assessments due to the non-compliance of this mode to social distancing regulations, given the COVID-19 pandemic. However, Krach et al. (2020) argued that, due to the COVID-19 pandemic, professionals had no choice but to shift to digital modes and assessment, and this could have had negative consequences, specifically for those assessments that are normally conducted face-to-face. The findings further signify that the participants indicated that they use gamified assessments as it helps with keeping younger candidates engaged. However, the findings also suggested that the main reason why candidates do not use gamified assessment is that they lack knowledge about and expertise in this assessment mode. Armstrong et al. (2016) suggested for gamified assessments to form part of the standard assessment practice and for it to be cemented in the profession, Industrial Psychology professionals would need to gain further and more profound knowledge about this mode.

Objective 4: To explore the potential benefits associated with the use of different modes of psychometric assessment

The researcher further explored the potential benefits associated with the different modes of psychometric assessment. Johar and Kumar (2016) stated that the wave of technology and innovation would leverage new assessment methods that could potentially move attention to quality and time effectiveness. This is supported in the current study as the findings indicate that the participants perceive computerised assessments as beneficial because it is time-efficient, seeing that manual scoring is eliminated, the candidate can complete the assessment in their own time, and it enables the Industrial Psychology professional to process the results much quicker. The findings further indicated that the participants also found computerised assessments to be beneficial due to the safe and secure online portals. This links to the Industrial Psychology professional's responsibility to ensure the safety of assessment data, and online portals aid the professional in doing so (APS, 2018). However, Lubbe and Nel (2012) mentioned that the purchasing of test material for paper-and-pencil assessments adds unnecessary costs to the assessment battery. Even though certain benefits are associated with paper-and-pencil assessments, Jivan et al. (2020) suggested that the landscape of assessments is changing and the benefits of this mode of assessment could be outweighed by digital

assessment solutions. PSI (2018) suggested that a benefit associated with gamified assessment is high levels of face-validity. In line with literature, the findings of this study indicate that gamified assessments are beneficial due to the higher face-validity that can be achieved with this assessment mode. Contrary to this, Testgrid (2018) mentioned that the resistance of the assessment market to gamified assessment could be attributed to the questionable validity and a lack of research on this assessment mode. Georgiou and Nikolaou (2020) suggested that gamified assessments show high levels of potential in the assessment arena and this assessment mode could be regarded as the future of psychometric assessments.

Objective 5: To explore the potential challenges associated with the use of different modes of psychometric assessment

The researcher further explored the potential challenges associated with the use of different modes of psychometric assessment. The findings of the study suggested that most participants indicated that the challenges they experience with computerised assessments are technical challenges and challenges regarding online supervision. However, Ryana and Derousb (2019) pointed out that even though online administration comes with its own challenges, computerised assessments have made it possible to reach higher levels of efficiency due to the accessibility associated with this assessment mode. This was also supported by the current research study as Industrial Psychology professionals indicated that they could reach a wider audience through computerised assessments. The findings further signify that the most prominent challenges associated with paper-and-pencil assessments are the susceptibility to human error and the amount of labour required in the process. Tippins et al. (2018) supported this idea by suggesting that paper-and-pencil assessments present an increased risk for errors in the assessment process, from administration to interpreting the results. Lubbe and Nel (2012) also mentioned that a downside of paper-and-pencil assessments is the labour-intensiveness which decreases the viability of using this mode. Participants further indicated that the main challenge they experience with gamified assessments is lack of knowledge about gamified assessments. Toda et al. (2018) once again argued that limited literature in gamified assessments serves as a significant barrier for individuals to start using this assessment mode. On the contrary, the Cut-e Group (2018) found heightened interest in gamified assessments as Industrial Psychology professionals ultimately aim to increase candidate's engagement levels.

Objective 6: To explore recommendations made by Industrial Psychology professionals to enhance the use of psychometric assessment

The researcher also explored recommendations made by the participants to enhance the use of psychometric assessment. The findings of this study report recommendations for instance that higher education institutions should consider re-evaluating the training provided to Industrial Psychology professionals. These findings are supported further by a study conducted by Van Eeden et al. (2016) who found that training programmes would need to be reviewed, seeing that a great need exists amongst Industrial Psychology students to acquire more in-depth training in test use. The findings also reported that Industrial Psychology professionals should bear in mind that it is essential to shift to digital assessments to preserve the human factor when conducting computerised assessments. This means that the Industrial Psychology professional would need to find alternative ways of putting the candidate at ease. A further recommendation that was made in this study was that all psychometric assessments should be standardised for the South African context to ensure its appropriateness for fair use on all groups in the population. The HPCSA (2019) indicated that higher institutions teaching psychometrics should make it a priority to educate students on South African-appropriate assessment and avoid international measures, since not using it could lead to discrimination against candidates. The final recommendation that was evident in the findings was a need to increase the focus on ethical test use by ensuring consistent and fair assessment practices. This could be done by ensuring that assessment practices are in line with the Health Professions Act No. 56 of 1974; Annexure 12.

Objective 7: To make recommendations for future research and practice

This will be addressed under the heading 3.3 Recommendations

3.2 Limitations

Even though valuable insights were gathered in this study, the researcher also identified limitations pertaining to the study.

The sample size of the study ($N=21$) could be considered the first limiting factor in the study. For that reason, the results of the study cannot be generalised to another context because the

sample size is too small. However, it should be noted that the main aim of qualitative data is not to generalise the results.

A further limitation in the study was the lack of diversity in the study seeing that (95%) of the participants were white, and (5%) were coloured. This is not an accurate reflection of the diversity of the Industrial Psychology profession. Hence results cannot be generalised to that context.

The data collection method could also be listed as a limitation. The use of online qualitative surveys brought about that the researcher did not have an opportunity to probe answers when necessary. However, in the design of the questionnaire, participants were encouraged to provide detailed explanations for their answers. This is further supported by the number of participants who attempted the qualitative survey compared to the number of individuals who accessed the platform. This means that the online data collection method could have discouraged individuals to participate in the study.

A further limitation was the collection of data during the COVID-19 pandemic, which could have had an influence on their responses, seeing that during that period the only viable assessment mode was digital assessment (i.e. computerised and gamified assessments). This means that the participants could have responded favourably to computerised and gamified assessments.

The final limitation of this study was language because the qualitative survey was only presented to participants in English; they could have found it difficult to articulate themselves, seeing that (67%) of the participants were Afrikaans-speaking and (33%) English-speaking. However, an inclusion criterion of the study was that participants had to be proficient in English; this could have limited the adverse impact.

3.3 Recommendations

Recommendations are directed to organisations and future research.

3.3.1 Recommendations for the organisation

To enhance the use of psychometric assessments, organisations can use the findings of this study in combination with those of other studies to their advantage. In this study, it became evident that the digital age increases the number of considerations Industrial Psychology professionals and organisations should give to the different modes of assessment. From the findings it is recommended that organisations review and update their existing psychometric assessment policies or draft new policies to ensure that all the factors associated with best-practice standards in assessments are addressed and implemented. The main points in the policy could signify aspects such as assessment mode appropriateness, test security, data storage, administrative duties, contingency management, fairness etc. By doing so, organisations and professionals can limit the risk and the consequences of non-compliance to regulations in the assessment sphere.

A further recommendation is for organisations and professionals to take heed of the findings of the study to conduct comprehensive needs analyses before selecting assessment batteries. Considerations during the needs analysis would include evaluating the type of candidate or client for planning lead times, mode of assessment, types of assessment etc. This would mean that the Industrial Psychology professional takes a tailored approach to fit the candidate's needs and avoid following a one-size-fits-all approach in assessment.

It is also recommended that Industrial Psychology professionals take the first step in familiarising themselves with the latest developments in assessment to remain relevant and to ensure that high-quality standards are maintained in the profession. This could be done by collaborating with other professionals, test publishers and governing bodies such as the Health Professions Council of South Africa (HPCSA) and the Society for Industrial and Organisational Psychology (SIOPSA) to gain further knowledge by attending continuous professional development (CPD) courses and workshops. It is essential for Industrial Psychology professionals, when using new assessments to not compromise on fundamental principles such as test security, ethical behaviour and data-quality (Wright et al., 2020).

The findings of the current study could also be used by Industrial Psychology professionals to advise decision-makers of organisations on the benefits associated with the use of psychometric assessments, but also to inform them about the potential challenges. It could mean that test use in South Africa could be expanded if higher levels of awareness could be

achieved. It remains the responsibility of the Industrial Psychology professionals to use their expertise and knowledge about assessments to show the value-add on an individual, group and organisational level.

The findings lastly signify that organisations should aim to preserve the human element when administering assessments, regardless of the assessment mode used by the organisation. This could be done by establishing a professional relationship, ensuring clear communication regarding the process flow, including face-to-face interaction in the process, be it in person or via an online application such as *Zoom* or *Microsoft Teams*. By doing this, the Industrial Psychology professional will create a non-threatening test environment for the candidate to perform optimally. Maharaj and Page (2019) supported this idea by suggesting that organisations should remember to re-engineer the human touch in this digital age.

3.3.2 Recommendations for future research

Taking into consideration the findings of this study, specific recommendations could be made for future research. It is recommended that a larger sample size be used in future research for collecting data. By doing so, it will not only enable the researcher to generalise the results of the study, but also expand the knowledge base of Industrial Psychology professionals. It is further recommended to gather data from a representative sample of the Industrial Psychology profession by including all races and genders.

When conducting research, and the sample includes more than one Psychology category (i.e. Industrial Psychologist and Psychometrists), it is recommended that an equal proportion per category be included in the sample. In this study 48% of the participants were Industrial Psychologists, and 52% Psychometrists. A further recommendation is to afford the research participants the option of completing the qualitative survey in their home language. This could increase their ability to express themselves without possible language barriers impacting their responses. In addition, it is recommended that data be collected via face-to-face interviews as this will provide the researcher with additional context.

Further qualitative studies that could be conducted can be aimed at exploring specific psychometric assessments and the purposes for which Industrial Psychology professionals prefer to use those assessments, including test providers, industries in which it is used etc. This could potentially provide test publishers and distributors and other Industrial Psychology

professionals with valuable insights into the assessment landscape in South Africa. It is also recommended that future studies explore the aftershock of the COVID-19 pandemic on assessment-use and -practices. The final recommendation is to conduct quantitative studies on the utilisation of the different modes of psychometric assessment, as this will provide a reflection of the use of assessments in the industry that could be generalisable. It will also indicate whether South Africa is shifting to digital modes such as computerised and gamified assessments.

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