

Development of a strategic guideline to design an intelligence instrument applicable to South African school learners: A multi-method exploration

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Thesis accepted in fulfilment of the requirements for the degree *Doctor of Philosophy in Health Sciences with Psychology* at the North-West University

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PREFACE

- This PhD research study has followed the article format (kindly refer to Section 2), as described in the general A-rules of the North-West University.
- The first article from phase 1 has been successfully published, and the second article has been submitted for publication. These manuscripts were referenced and formatted according to the requirements of the relevant journals. Nevertheless, the referencing and formatting guidelines as indicated by American Psychology Association (APA) 7th ed. were followed for throughout this PhD thesis document, including all three articles.
- Tables and figures were not placed at the end of this PhD thesis document as addenda, however, can be found within sections 1 and 2.
- Page numbering is consecutive throughout the PhD thesis. The software application Turn-it-in was used to check for plagiarism.
- Language of this PhD thesis was edited by Ms. Monica Botha.
- After careful consideration, all parties involved have deemed this PhD thesis fit for submission for examination.

SUMMARY

Considering formal intelligence assessment instruments currently applied to South African school learners, characterised as a multicultural and multilingual population, and residing and schooled in multidiverse contexts, the applicability, reliability, validity, and fairness of these instruments have come into question. South African psychologists and psychometrists need to conduct intelligence assessments as part of a battery of assessments, following referrals from parents, guardians, therapists, or schools after observing challenges such as learning difficulties or to guide school learners in their educational careers. Based upon findings from intelligence testing and other forms of data gathered (i.e. interviews, background history taking, other measurements such as scholastic and emotional assessments), practitioners need to appropriately deduce diagnoses and suitable interventions (i.e. placement in a special needs classroom/school, arrangement of concessions for formal testing, referral to therapists or clinicians, and more) that are tailored with the best interest of the school learner in mind. Several legislation and policies have been implemented that guide practitioners in the field of psychometrics to employ professional and ethically correct practices. This implies that practitioners need to conduct intelligence assessments that are fair and reliable by using measurements that are applicable and valid. The South African school learner population is characterised as heterogeneous; the multilingual, multicultural school learners reside and attend schools in contexts that vary in levels of socio-economic stance, acculturation, and quality of education received. In order to conduct intelligence testing that is fair to this multi-ethnic group of school learners, practitioners would need appropriate intelligence measurements and assessment skills. This is where the challenge lies, as there is a shortage of cross-culturally fair intelligence measurements. In addition, if the practitioner does not conduct the assessment in the attempt to prevent unfair testing practices, it would lead to a scenario where the learner may be deprived from the opportunity to receive the

needed guidance and help; excluding any child from receiving professional services on the grounds of a demographic element such as cultural or language is against that school learner's constitutional right to equality and having access to healthcare services. Therefore, this PhD research study has aspired to explore the need for a strategic guideline for practitioners (i.e. psychologists, psychometrists, researchers, and experts in intelligence measurement development/adaptation) to ensure that when intelligence instruments are designed, they are applicable and fair when administered to South African school learners.

This PhD research study adopted a multi-method approach, consisting of three phases. Phase 1 (Document 1) entailed conducting a critical review of peer-reviewed scientific literature related to the topic of intelligence assessment instruments applied to South African school learners. Extracted data were analysed qualitatively using the thematic data analysis method, which revealed the following three themes: (i) Applicability of intelligence instruments administered to South African school learners; (ii) Contextual and demographic influences affecting performance on administered intelligence instruments; and (iii) Intellectual measuring instruments related to developmental and cognitive ability levels. Phase 1 concluded by stating that demographic (i.e. language, culture) and contextual (i.e. socio-economic status, quality of educational background) elements could influence the applicability of an intelligence instrument to South African school learners, bringing into question the reliability, validity, and fairness of these instruments. It is therefore important that practitioners in the field of psychometry take these demographic and contextual influences into account before developing or selecting an intelligence instrument to assess school learners in South Africa, as these elements may cause incorrect test results. This could furthermore yield bias in the interpretation and reporting of results, which could lead to inappropriate diagnoses and intervention plans.

Phase 2 (Document 2) aimed to explore and describe the experiences of a group of intelligence test developing and adaptation experts as well as psychologists and psychometrists who have administered intelligence assessment instruments to South African school learners in various contexts. The qualitative interpretive description research design was applied. Using an internet-based communication platform, twelve psychologists/psychometrists ($n = 12$) were interviewed, of which six were also experts ($n = 6$) in intelligence test development and/or adaptation. Participants represented all nine provinces across South Africa. Four themes emerged after reflexive thematic analysis of recorded data from the semi-structured interviews, namely: (i) Utilised intelligence measurements in the current South African school learner context are not relevant anymore; (ii) South African education system is a major issue specifically within lower socio-economic status contexts; (iii) Newly or adapted intelligence measures cannot realistically be standardised in the current South African school learner context; and (iv) Key informants' recommendations from their experiences. From the shared participant experiences in Phase 2, it became clear that currently administered intelligence measurements are unfair, inappropriate, outdated, and unsuitable to South African school learners, specifically when considering their multidiverse demographics and modern, multidimensional contexts at home and school. These influencing elements have the tendency to yield test performance/results that are not representative of the learners' true performance (especially those receiving lower quality of education at less privileged schools), which could lead to inappropriate diagnoses and intervention plans. These findings suggest a need for practitioners in the psychometric field to have access to intelligence instruments that are applicable and fair to all South African school learners.

Phase 3 (Document 3) aimed to develop a strategic guideline which provided information to practitioners in the field of intelligence assessment, on how to design an

intelligence assessment instrument that is applicable to South African school learners. This was done by employing a qualitative document analysis through the reflexive thematic analysis on Document 1 (published) and Document 2 (in the process to be published) and combining their findings. The following four themes were identified: (i) Utilised intelligence measurements in current South African school learner context are inapplicable; (ii) Newly or adapted intelligence measures cannot really be standardised in the current South African school learner context; (iii) Current South African education system needs to be taken into consideration; and (iv) Current South African school learner contextual and demographic influences need to be taken into consideration. From these themes, steps were created that form the strategic framework to design applicable intelligence instruments for South African school learners. The steps describe both guidance towards instrument design as well as the manner and context of applying the design itself, since these features function as interrelated entities. In conclusion of Phase 3 it became clear that there exists an essential need for emic, up-to-date, applicable, and fair intelligence measurements to be administered to multidiverse South African school learners. When administering intelligence assessments to South African school learners, practitioners are ethically and legally obligated to conduct practices that are fair and equal to all; it is imperative that they consider the local school learners' schooling, demographic, and contextual (i.e. socio-economic status, acculturation level) background before developing or selecting intelligence measurements for assessment and subsequent diagnoses and crafting of intervention plans. This Phase and the PhD research study's developed strategic guideline to design an intelligence instrument suitable for a South African population of school learners, informs on fair assessment measurements and practices that will allow multi-ethnic equalisation and empowerment of both school learners and practitioners.

SOLEMN DECLARATION AND PERMISSION TO SUBMIT



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I, **Ilze van der Merwe**

declare herewith that the thesis/dissertation/mini-dissertation entitled (exact registered/approved title),

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which I herewith submit to the North-West University is in compliance/partial compliance with the requirements set for the degree:

Doctor of Philosophy in Psychology

Is my own work, has been text-edited in accordance with the requirements and has not already been submitted to any other university.

LATE SUBMISSION: If a thesis/dissertation/mini-dissertation of a student is submitted after the deadline for submission, the period available for examination is limited. No guarantee can therefore be given (should the examiner reports be positive) that the degree will be conferred at the next applicable graduation ceremony. It may also imply that the student would have to re-register for the following academic year.

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The undersigned declares that the thesis/dissertation/mini-dissertation:

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prepared by Ms I van der Merwe in accordance with the requirements of the Degree Doctor of Philosophy in Psychology at the North-West University, according to the specifications of the University, where available, and the latest standards for language editing and technical (computer-based) layout.

Editing was restricted to language usage and spelling, consistency, formatting and the style of referencing. No structural writing of any content was undertaken.

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To the best of my knowledge, all references have been provided in the prescribed format.

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MONICA BOTHA

23 November 2023

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SECTION 1: INTRODUCTION

Contextualisation

When assessing populations that are linguistically and culturally diverse, the International Test Commission (ITC; 2018) recommends employing measurements that are valid, fair, and suitable to the context and functioning of the assesseees. Calling it “high quality assessments”, the Center on Standards and Assessment Implementation (CSIA) (2018) stipulates that these assessments entail using measurements that hold principles of validity (it measures that which it intends to measure), reliability (i.e. it is consistent in measuring that which it claims to measure) and fairness; fair assessment entails being bias-free and coherent (manner of assessment is in alignment with the measurement’s intended purpose). Keeping these principals in mind whilst considering the current intellectual assessment practices that are conducted for South African school learners brings into question the appropriateness of those measures and practices employed (Shuttleworth-Edwards, 2023; Van der Merwe et al., 2022). Described as being multilingual and multicultural, school learners of South Africa (ZA) reside and attend schools in segregated contexts that differ in socio-economic status (SES) and quality of education offered (Cockcroft & Sumaya, 2022; Shuttleworth-Edwards, 2023). In addition, differences in levels of acculturation occur with some school learners living in rural, non-Western circumstances in contrast to school learner groups with higher SES, Westernised lifestyles (Cockcroft & Sumaya, 2022; Shuttleworth-Edwards, 2023). Commonly employed intellectual measurements lack suitable standardisation and norming, which raise a red flag to the appropriateness of diagnoses and interventions derived from performance on these tests (Cockcroft & Sumaya, 2022; Shuttleworth-Edwards, 2023).

Value of Intelligence Measurement

Intelligence testing occurs mostly in educational and clinical settings where children exhibit behavioural or learning challenges (i.e. determining if the school learner's intellectual ability plays a role), for certain court cases (i.e. considering ability to participate in a trial or take responsibility for actions), medicolegal assessment (i.e. when requesting disability benefits or for trials after medical intervention), or after head illness or trauma (Lucas, 2013; Spielman et al., 2022). Diagnoses and beneficial intervention strategies can be drawn from the measured results; school learners who need support can be identified, who otherwise could have been missed or wrongly judged or treated (Spielman et al., 2022). Inappropriate diagnoses and interventions may, however, cause more damage than good; assessing school learners with tests that are culturally irrelevant and unsuitably normed is likely to result in lower test performances that are not a true reflection of the school learners' true abilities (Cockcroft & Sumaya, 2022; Shuttleworth-Edwards, 2023; Spielman et al., 2022).

Changes in Post-Apartheid South Africa

During the apartheid era (1948-1994), ZA experienced racial and economic division between Caucasian (referred to as "White") and non-Caucasian (i.e. Coloured, African [referred to as "Black"], and Indian/Asian) population groups, which caused segregation in terms of SES, access to resources/opportunities, quality of education received, and more; the Caucasian subpopulation group (mainly versed in English and Afrikaans) took favour above the other three groups (Laher & Cockcroft, 2014, 2017; Meiring, 2007). From the early 1980s, practitioners in the field of psychometry became increasingly aware of the need for culturally fair test measurements and launched various initiatives to create and adapt applicable tests (Cockcroft & Sumaya, 2022; Meiring, 2007); however, many of these efforts were to no avail, as with the example of the Senior South African Scales-Revised (SSAIS-R) (originally developed and normed for Caucasian English and Afrikaans school learners) to

which additional norms were developed for Indian and Coloured school learners but not for African school learners (Cockcroft & Sumaya, 2022).

During the post-apartheid government, new legislation and requirements were promulgated to promote valid, unbiased, and fair testing practices in ZA (Laher & Cockcroft, 2014; Meiring, 2007), i.e. the Constitution of South Africa (South African Government, 1996), the Employment Equity Act 55 (Department of Labour [DoL], 1998), the Health Professions Act 56 (Department of Health, [DoH], 2018), and the Health Professions Council of South Africa (HPCSA, 2016). Practitioners in the field of psychometry responded by stating their awareness of testing fairly and appropriately; however, complained of the lack of cross-culturally fair and up-to-date assessment measurements (Foxcroft et al., 2004).

Despite numerous efforts from researchers to provide appropriate intelligence tests, the shortage of cross-culturally fair intelligence instruments remains a challenge due to difficulties such as the multi-ethnic composition of the South African population, shortage of resources, and segregated educational opportunities (Cockcroft & Sumaya, 2022; Lucas, 2013; Mitchell et al., 2018). Upliftment initiatives driven by the post-apartheid government have resulted into more and more school learners progressing into higher SES lifestyles and transforming into Westernised schooling and living practices (Shuttleworth-Edwards, 2023). These trends of rapidly occurring acculturation and urbanisation within a multi-ethnic population exacerbate the already complex challenge of developing/adapting applicable intelligence measurements, due to the increased frequency of required appropriate norms and other adaptations (Lucas, 2013; Shuttleworth-Edwards, 2023).

Problem Statement

The current state of locally developed intelligence tests and internationally norm-adapted intelligence test instruments is not applicable to all South African school learners (Cockcroft & Sumaya, 2022; Shuttleworth-Edwards, 2023). Intelligence tests administered by

psychological assessment practitioners therefore do not adhere to the formally proposed requirements for reliable, valid, and locally normed intelligence tests (Cockcroft & Sumaya, 2022; ITC, 2015, 2018; Shuttleworth-Edwards, 2023). ZA presents as a multilingual, multicultural, and developing country with variety in SES, quality of education, and acculturation levels (Laher, 2022; Lucas, 2013; Shuttleworth-Edwards, 2023); the country also faces the difficulty of having a lack of resources (Cockcroft & Sumaya, 2022; Mitchell et al., 2018).

Practitioners are ethically and legally obligated to ensure that fair assessments are conducted to all school learners, regardless of their culture, language, or any other grounds (DoH, 2018; HPCSA, 2016; ITC, 2015, 2018; South African Government, 1996). When having to assess multi-ethnic populations, test developers have the responsibility to inform and provide evidence of intended instrument uses and interpretations after scoring, and test administrators have the responsibility of providing a rationale and evidence for selecting a particular instrument and manner of interpreting scores after testing (ITC, 2018). Despite several research attempts which aimed at minimising cultural bias and providing more accurate measures of intelligence across different cultures (see Laher & Cockcroft, 2013; Shuttleworth-Edwards & Truter, 2023; Van der Merwe et al., 2022), currently there still exists a shortage of cross-culturally fair intelligence measurements to school learners in ZA (Cockcroft & Sumaya, 2022; Shuttleworth-Edwards, 2023; Van der Merwe et al., 2022). This shortage of suitable intelligence measurements leaves the test administering practitioner in the predicament of having to decide between applying cross-culturally unfair test instruments (which could lead to inappropriate findings, diagnoses, and interventions), or impeding a school learner from receiving the needed guidance and help which could be offered after assessment (i.e. going against the child's constitutional right to equality and access to healthcare services). Therefore, a need presents itself on determining how to design

intelligence measurements for South African school learners that would be cross-culturally fair, suitable, and valid.

Aim

The main aim of this PhD research study was to use a multi-method exploration to develop a strategic guideline to design an intelligence instrument applicable to South African school learners, which led to the main research question: *Which type of recommendations could be provided to develop a strategic guideline to design an intelligence instrument applicable to South African school learners?*

The following sub-questions were formulated to answer the main research question:

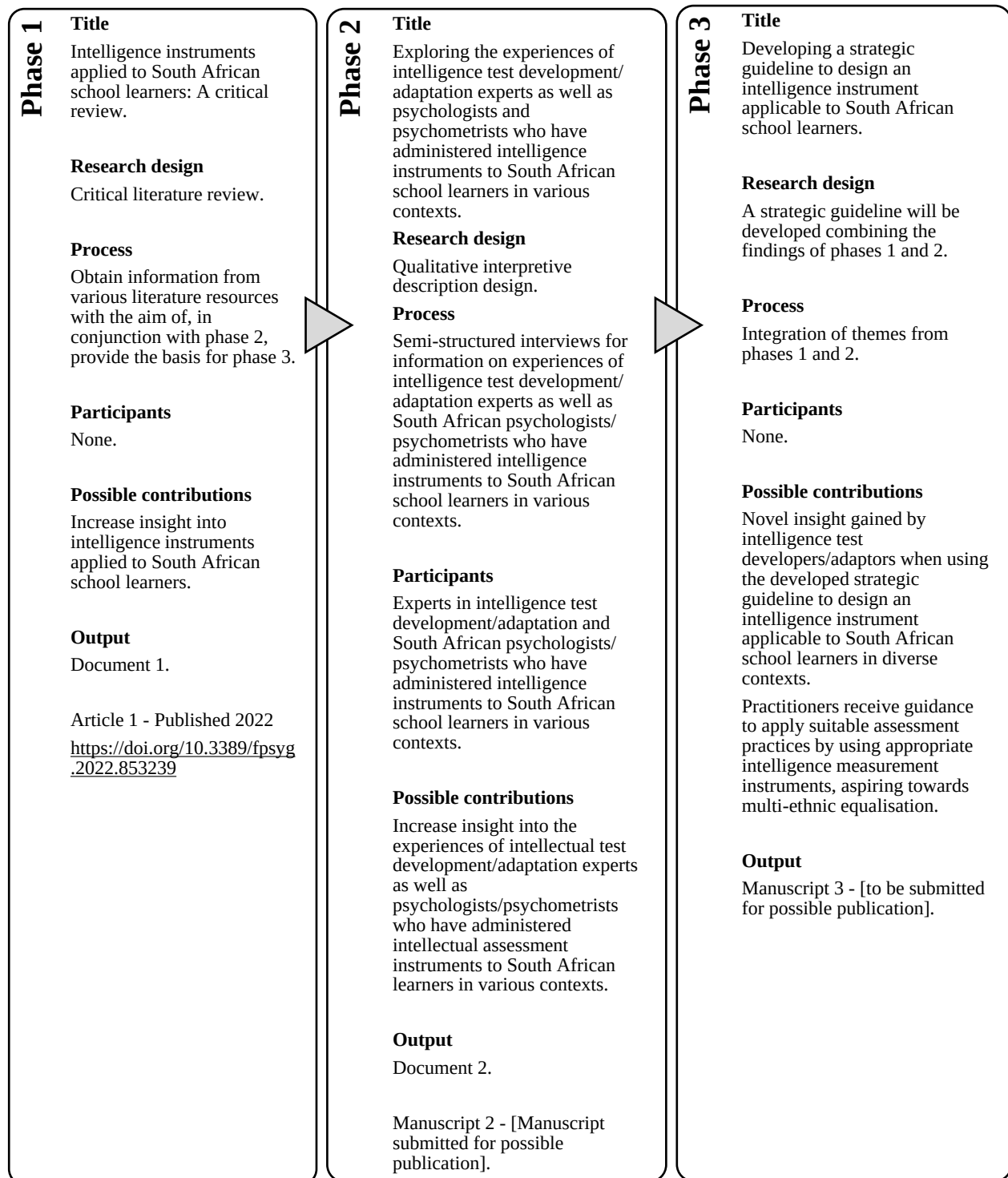
- Phase 1 (Document 1): *What does literature state regarding intelligence assessment instruments applied to South African school learners?*
- Phase 2 (Document 2): *What are the experiences of intelligence test developing and adaptation experts as well as psychologists and psychometrists who have administered intelligence assessment instruments to South African school learners in various contexts?*
- Phase 3 (manuscript 3): *Which elements should be incorporated into a strategic guideline to design an intelligence instrument applicable to South African school learners?*

Methodology

This PhD research study followed a multi-method approach, which is a combination of various methods used (Beach, 2020). This PhD study consisted of three phases, where each phase had its own aim, research question, method, and findings. A separate but interrelated article was written for each phase (kindly see Figure 1 for a summary of the different phases). The multi-method approach allowed for the opportunity to engage and interpret the PhD study's research problem, method, and findings from various angles,

providing a more diverse, considered, and holistic understanding (Beach, 2020). This, in addition, helped researchers to achieve greater levels of criticality in their research (Blackman & Fitzgerald, 2006).

Figure 1: Overview of Three Phases for this PhD Research Study



Phase 1 was a critical review, where the researcher applied the seven-step critical review guideline as suggested by De Klerk and Pretorius (2019) and visually illustrated in Figure 2, to examine intelligence instruments applied to school learners in South Africa. A qualitative synthesis was done by means of a thematic data analysis model, introduced by Clarke and Braun (2013, 2018), depicted in Figure 3.

Figure 2: *Seven-step Procedure for Phase 1* (De Klerk & Pretorius, 2019)

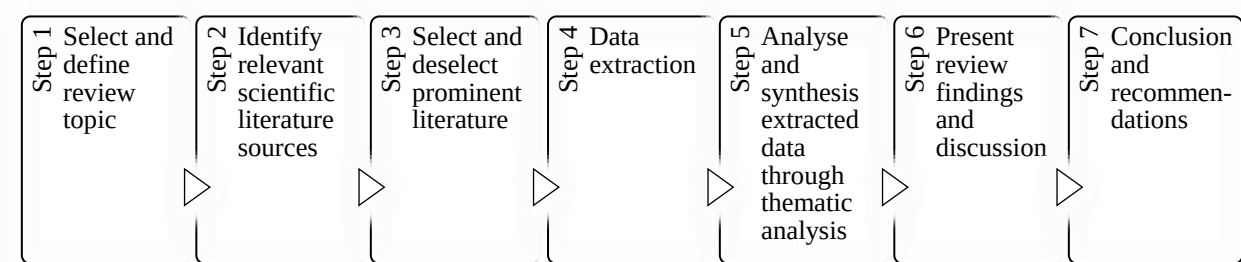
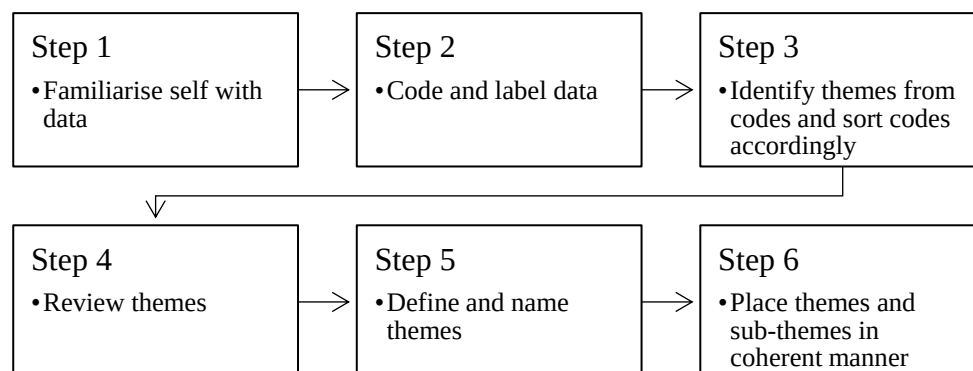


Figure 3: *Qualitative Thematic Data Analysis Process* (Clarke & Braun, 2013, 2018)



The aim of Phase 2 was to explore the experiences of experts in intelligence test development or adaptation as well as the experiences of psychologists and psychometrists who have administered intellectual assessments to South African school learners in various contexts. A qualitative research approach, with an interpretive description research design, was used. As a smaller, qualitative scale of investigation, the interpretive descriptive design suited the second phase's research aim and question well, as it allowed for more in-depth findings and clinical understanding through the capturing of themes and patterns within subjective, yet reasoned and mindful interpretations (Thorne, 2016; Thorne et al., 2004;

Williams, 2019). According to Williams (2019), the qualitative research approach serves as a strong basis for social and natural sciences. Qualitative methods helped to empower the researchers to explore a variety of first-hand data, as well as provide opportunity to ask additional ‘how’ and ‘why’ questions on phenomena such as human experience (Williams, 2019).

Especially during Phase 2, in light of the international Corona virus (COVID-19) pandemic, the researcher faced various limitations, among other things not being able to have face-to-face contact with participants to follow certain processes (i.e. signing informed consent, booking interviews, and conducting semi-structured interviews). The researcher and mediator were thus obligated to communicate and conduct interviews with participants over internet-based mediums of communication, namely Zoom and e-mail. This alternative medium of communication, however, did not only help to bridge the limitation challenges brought about by the COVID-19 pandemic, but also yielded other opportunities such as providing access to a larger variety of participants, which would not have been possible through the conventional face-to-face method of communication.

Phase 3 and overarching PhD research study’s aim intended to develop a strategic guideline to design an intelligence instrument applicable to South African school learners, using the combined findings of Phases 1 and 2. The strategic guideline will provide advisory guidance to intelligence test developers who plan to design intelligence assessment instruments that would be suitable, and therefore sound, when administered to South African school learners. This is essential, based on the gaps found in the psychometric industry in ZA, as discussed earlier in this PhD research study.

Ethical Considerations

This PhD research study received ethical approval from the North-West University Health Research Ethics Committee (NWU-HREC), Faculty of Health Sciences, with reference number: NWU-00191-21-A1. All ethical guidelines for good practice, as prescribed by the HPCSA (2016) and North-West University were followed throughout this PhD research study. All research team members reviewed the North-West University COVID-19 Occupational Health and Safety Standard Operating Procedure before commencing the PhD research study, as requested by NWU-HREC. All research team members also complied with the Protection of Personal Information (POPI) Act 4 of 2013 (South African Government, 2013) during the research proceedings.

Possible Risks and Dangers

Phase 1 (critical review) and Phase 3 (strategic guideline development) did not involve any human participants, which reduced the potential risk to a minimum. Phase 2 (demographic questionnaires and semi-structured interviews) made use of human participants (n = 12) who are intelligence test development/adaptation experts and psychologists/psychometrists registered at the HPCSA. Semi-structured interviews provided information regarding the participants' professional experiences and opinions, not their personal experiences; for this reason, the potential risk for Phase 2 was considered minimal.

Regardless, the researcher, as a qualified psychologist, performed the semi-structured interviews (in Phase 2) by employing empathetic, invitational language and listening skills to help ensure a safe and comfortable environment for the participants to openly share their experiences. The semi-structured interviews were conducted in a private, safe room, and otherwise in the comfort of their self-selected, familiar environment, owing to the interviews being performed online (via Zoom). There was the possibility of participants feeling uncomfortable due to the technical element and/or potential technical difficulties that could

occur with the internet-based interviews; these minor incidences were treated with patience and supportive guidance. Emphasis was placed on voluntary participation, which enabled participants to withdraw whenever they choose to do so (prior to data analysis). None of the participants were harmed or abused in any physical, psychological, legal, or social manner while participating in this research.

Direct and Indirect Benefits

There were no direct benefits identified for participants; however, participating in this research study allowed participants to voice their concerns and provide inputs that could enhance their professional field. Indirect benefits identified with the application of the strategic guideline, include (1) experts in intelligence test development/adaptation will be more equipped to design/adapt intelligence instruments that are applicable and fair to South African school learners; (2) psychologists/psychometrists administering newly designed, suitable tests will be able to conduct adequate and suitable intelligence assessment practices to all South African school learners from various contextual backgrounds; and (3) South African school learners being empowered with a fair chance to perform accurately in intelligence tests, developed/adapted according to recommendations provided in the strategic guideline, which would lead to suitable diagnoses and intervention plans.

In addition, applying the findings of this PhD research study effectively could enhance the view and restore faith in South African psychometric assessment practices and the field of psychology in ZA. This stands in contrast to the discriminating and segregated psychometric practices that were conducted during the apartheid era, and is in line with the continuous efforts from post-apartheid government, where South African psychologists/psychometrists are enabled to perform emic and ethnically appropriate practices through applicable, resourceful, and empowering intelligence assessment processes for all South African school learners.

Process of Sample Recruitment and Informed Consent

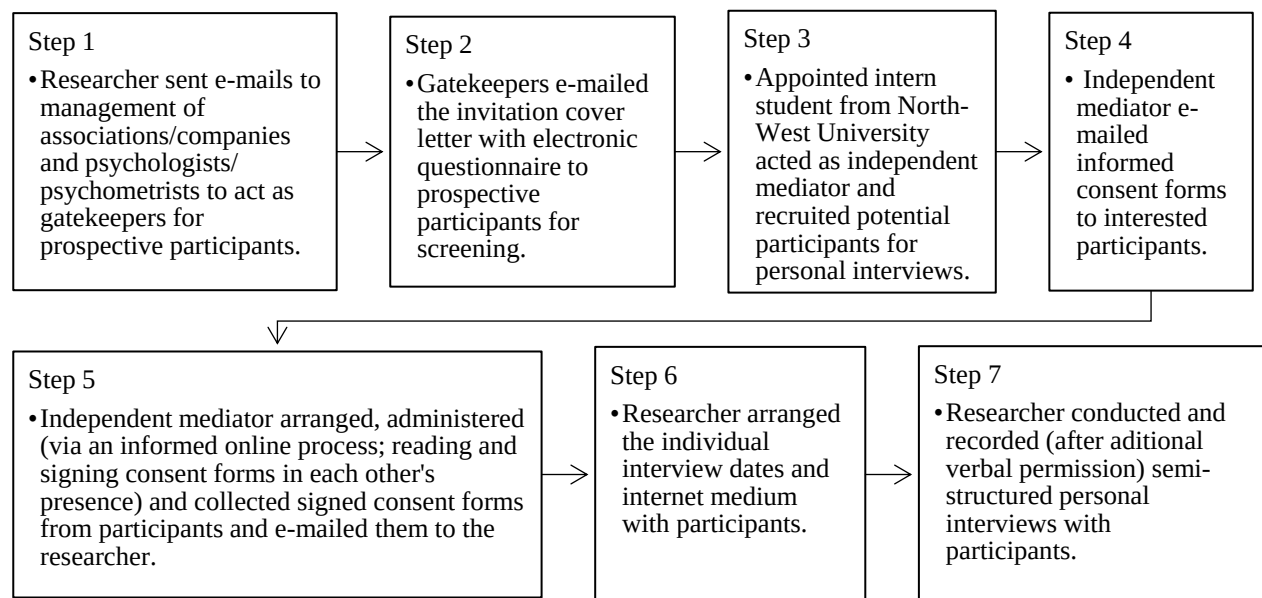
Phase 1: The critical review entailed following four steps of identification, screening, eligibility, and inclusion. The process entailed identifying and selecting a literature sample from scholarly books, articles, journals, and dissertations/theses based on their relevance to the inclusion criteria. First, the researcher turned her focus on critically reading the titles and abstracts of the literature sample, then the full-texts, and pruned the literature sample by excluding records which held no relevance to the inclusion criteria. All essential and relevant information of reviewed literature works (i.e. authors' information, title, publication date, methodology, and findings) was then recorded onto a data sheet for data processing by means of thematic analysis. Appraisal of the reviewed literature was conducted by the researcher as well as promoters, to ensure quality and help limit bias.

Phase 2: Participants were sampled via purposive and snowball sampling, by completing an electronic demographic questionnaire. In light of the international COVID-19 pandemic during the time of this PhD research study, the researcher faced various limitations, among other things not being able to have face-to-face contact with participants. The researcher was thus obligated to conduct the individual, semi-structured interviews over Zoom, an internet-based medium of communication; this alternative medium of communication, however, did not only help to bridge the limitation challenges brought about by the pandemic, but also yielded other opportunities such as providing access to a larger variety of participants, which would not have been possible through the conventional face-to-face method of communication.

Firstly, written permission was received from management of associations and companies such as South African Clinical Neurological Association (SACNA), Society for Educational Psychology of South Africa (SEPSA), and Mindmuzik Media, via e-mail, to act as gatekeepers and send the invitation cover letter for the demographic questionnaire to their

members/clients (i.e. HPCSA registered psychologists, psychometrists, and experts in intelligence test development/adaptation). The invitation cover letter briefly explained the research and related ethical guidelines and provided a link that led to the electronic demographic questionnaire to be completed, if they decided to do so; the letter and demographic questionnaire also asked and provided information on acting as gatekeepers and forwarding the invitation letter to other psychologists, psychometrists, or experts in intelligence test development/adaptation. Prospective participants for the internet-based, individual semi-structured interviews were selected after screening answered questions in the demographic questionnaires and keeping the research aim as well as inclusion and exclusion criteria in mind. The number of participants selected for interviews was determined as soon as the point of data collection saturation had been reached and topics started repeating. Selected participants were recruited via the appointed North-West University intern research psychology student (Mr. Ryan du Toit), acting as independent intermediary between the researcher and potential respondents. The mediator e-mailed the informed consent form (see Addendum D) to invite and inform the potential participants of the research inquiry (in the form of semi-structured interviews), after permission, and provided them with the mediator's contact details; this allowed the potential participants the freedom to contact the mediator if they were interested in participating. The independent mediator was responsible for arranging and administering the informed consent process which occurred online. Both parties had to sign the consent form in each other's presence through the online platform of Zoom. Participants were granted the opportunity to discuss any concerns or questions they might have with the independent person. The mediator then sent the signed consent forms to the researcher, who contacted the participants to schedule an appointment for the individual, online semi-structured interviews. Kindly refer to Figure 4 for an illustrated summary of these steps taken by the gatekeepers, independent mediator, and researcher.

Figure 4: *Procedural Steps Taken for Recruitment, Mediation, and Interview Process*



The gatekeepers and independent mediator acted as independent, neutral mediating agents and thus had a neutral stance towards the study and participants to help illuminate any views or experiences of contradicting influence or coercion that could be provided by the researcher or any authoritative figure or party that could cause potential power relations. The intention was to create an environment that allowed voluntary informed consent and voluntary participation. The independent mediator was a research psychology intern within the School of Psychosocial Health of North-West University (who has received the Basics of Health Research Ethics Training) and was required to sign a confidentiality agreement before acting in the mediating role.

Phase 3: Overlapping themes from Phase 1 (Document 1: critical review) and Phase 2 (Document 2: semi-structured interviews) were identified and combined to develop new themes for Phase 3. Based upon themes described in Phase 3, the strategic guideline was developed which provides information on how to design intelligence instruments that are applicable to South African school learners. In addition, the researcher made certain to construct the strategic guideline in such a way that it is transparent, user-friendly, and adjustable to various contexts in ZA.

Respect for Persons

The researcher conducted herself in a professional manner. In Phase 2, she treated participants with respect, dignity, and equality. The researcher strived to be honest and open towards the participants regarding any information involving the research and did not engage in any form of deception regarding the aim, content, practices, or nature of this PhD research study. The researcher ensured participant privacy and safety as far possible.

Professional Competence

The researcher conducted professional and ethical practice, as prescribed by the Act 56 of 1974 (DoH, 2018), HPCSA (2016), NWU, and the POPI Act 4 of 2013 (South African Government, 2013), as well as scholarly integrity and high-level scientific research standards throughout the PhD research study. The researcher has earned the following qualifications: a Bachelor's degree in Psychology from the North-West University (obtained 1999, Cum Laude), a Higher Education Diploma at North-West University (obtained 2000), an Honours degree (obtained 2001), as well as a Master's degree (obtained 2009) in Educational Psychology at the University of Johannesburg. In addition, the researcher has successfully completed her Educational Psychology internship at University of Johannesburg in 2009 and passed the required ethics board examination in 2009 to register at the HPCSA as independent practicing Educational Psychologist. She has been practising as an independent registered Educational Psychologist since 2010. She qualified as Somatic Experiencing® practitioner in 2018, an internationally recognised body-oriented therapy for trauma (e.g. abuse, loss, discrimination, or bullying). The researcher completed the HREC ethics training course in January 2020. Moreover, the researcher has used a qualitative research approach (as part of a mixed method design) during her Master's mini-dissertation and received the necessary training in research design during her pre- and postgraduate studies at North-West University and University of Johannesburg. The researcher worked under the highly

competent supervision and guidance of her study promotor (Dr Petro Erasmus) and co-promotor (Prof Werner de Klerk).

Dr Petro Erasmus is a registered Educational Psychologist (since 2007), with a PhD in Psychology (obtained 2013). Her professional career includes acting as Educational Psychologist in private practice, performing as senior lecturer and research study promotor to post-graduate students at North-West University, and developing the Mathematics Whartels™ computer game for mathematical improvement among school learners.

Prof Werner de Klerk is a registered Research Psychologist (since 2010), with a PhD in Psychology (obtained 2013). His professional career includes acting as Associate Professor/Research Psychologist at North-West University. Additionally, Prof Werner de Klerk is highly competent in conducting qualitative data collection, qualitative data analysis by means of thematic and content analysis, and critical reviews; he has published an article on how to conduct critical reviews in psychology research (please see publication De Klerk & Pretorius, 2019).

Both study promotors (Dr Petro Erasmus and Prof Werner de Klerk) have training, publications, and experience in using the qualitative research approach and research designs. Moreover, they have provided impeccable and effective guidance and consultation throughout the PhD research study.

Privacy and Confidentiality

In Phase 2, all participants were informed of confidentiality and anonymity measures taken to ensure keeping participants' identity private and confidential. Participants also received information on the persons/parties who have access to the data, as well as the purpose of the research findings. This allowed for participant assurance and trust, with the message that their privacy would be respected on a continuous basis.

Steps were taken during data collection (personal semi-structured interviews) including the researcher arranging the interview to be conducted alone and in a separate room, ensuring privacy, and tactfully request the same from the interviewee, to provide them with the opportunity to share their experiences in a free and private manner. Considering the POPI Act 4 of 2013 (South African Government, 2013), the independent mediator (North-West University intern research psychology student) was required to sign a confidentiality agreement before acting as mediator/independent person during the screening phase and semi-structured personal interviews. The management of associations and companies acted as gatekeepers after providing goodwill written permission to do so (see Addendum C), and sent out, via e-mail, the cover invitation letters for the demographic questionnaire to their members/clients. Referred participants received invitation cover letters from the independent mediator after providing their written consent. These steps helped to safeguard the names and e-mail addresses of participants to ensure participant privacy.

Moreover, all participants' confidentiality and anonymity were ensured by the following manner in which all collected data were handled. The transcriptions, interview videos, and data analysis sheets with transcriptions of interviews were only made available to the transcribers, coders, promoters, and the researcher, who have all signed confidentiality agreements. Participants were assigned numbers and any participant identifying information, as well as any other data collected for this research, were kept in safe storage under lock and key, with electronic data being password protected. Data will be safely stored for seven years within the offices Community Psychosocial Research (North-West University), after which it will be destroyed.

Dissemination of Findings

Once this PhD research study has been completed successfully, the researcher will e-mail a copy of the PhD thesis, upon request, to participants as well as parties who acted as

gatekeepers in Phase 2. If the submissions of the manuscripts for possible publication are successful, findings of the study will also be available in the form of those published articles.

Rigour

Trustworthiness was upheld by following Guba's 1981 model of trustworthiness (Krefting, 1991) that contains four main elements namely credibility, transferability, confirmability, and dependability. These rigour elements applied in the three phases of this PhD research study are summarised in Table 1.

Table 1

Rigour for Three Phases of PhD Research Study

Rigour Elements	Phase 1	Phase 2	Phase 3
<i>Credibility</i>	Credibility was established by the researcher's sufficient engagement with literature selected from different sources as well as the cross-checking by multiple reviewers (promotors Prof Werner de Klerk and Dr Petro Erasmus). This helped to ensure insightful and accurate interpretation of the literature.	Confidence in the researcher's findings was attained by reporting them in an accurate and truthful manner. Sufficient time was allocated for the semi-structured interviews, during which field notes were also taken. The researcher built rapport with participants through the manner in which interviews were conducted (i.e. respect, empathetic listening skills) and informing them of the research process, voluntary participation, and ethical guidelines followed. With participants' permission, an audit trail (recording and transcribing data verbatim) was kept. To verify research findings and grant them credibility, Prof Werner de Klerk, an expert in coding, and a registered research psychology intern (Mr Ryan du Toit) in the School of Psychosocial Health (North-West University) acted both as co-coders.	Themes identified in Phase 3 (after the researcher combined the themes from Phases 1 and 2) were reviewed by the promotors to ensure accurate reporting of themes and to minimise possible researcher bias.
<i>Transferability</i>	Transferability was upheld through clear descriptions of the	Transferability was gained through the researcher providing clear, comprehensive	The findings and processes followed in Phase 3, when identifying the themes as

Rigour Elements	Phase 1	Phase 2	Phase 3
	critical review process and findings to allow other readers to be able, if desired, to judge or apply findings to other contexts.	descriptions of the methodology and findings to aid future research.	well as developing the strategic guideline, were explained clearly and can be applied to other contexts.
<i>Confirmability</i>	Confirmability was established by selecting and reporting relevant information as guided by the inclusion and exclusion criteria of the literature sample. The analysis process and themes identified from the literature sample were reviewed by the promotor.	Confirmability was upheld by the researchers applying structured methods to achieve reliability, when asking prepared questions (during the interview data collection stage) and employing the thematic analysis method (during the data analysis stage).	Through the process of document analysis, findings from Phases 1 and 2 were used to identify new themes in Phase 3. Promotor monitored this PhD research study throughout all three phases, to ensure that the researcher followed the procedures of the research proposal, as described and approved by HREC.
<i>Dependability</i>	Dependability was gained through the researcher conducting thematic analysis, according to the six steps specified by Clarke and Braun (2013, 2018), of accurately identifying themes, which were reviewed by the promotor.	Dependability was established through the researcher keeping objectivity. This was achieved through the audit strategy (leaving an accurate audit trail), field notes during the semi-structured interviews, and the co-coding and guidance of reviewers who interpreted data, themes, and findings with neutral, unbiased perceptions.	The promotor reviewed the identified themes and developed strategic guideline in Phase 3, to ensure relevancy and accuracy and reduce researcher bias and influence of preconceptions during the interpretation and handling of data. Additionally, the researcher was cognisant of her own influencing role in the research process by employing reflexivity and self-awareness as well as taking guidance from reviewers (Lainson et al., 2019).

Conclusion

Attempting to intellectually measure South African school learners is challenging, not only because the population is characterised as heterogeneous (i.e. multilingual and multicultural), but also due to the significant disparity in quality of education provided to school learners from different SES backgrounds. Continuous acculturation trends further complicate the scenario. For practitioners to conduct intelligence testing that is fair, valid, and

reliable to this multi-ethnic group of school learners, they would need suitable intelligence measurements and assessment skills. Literature and participant comments have revealed the shortage of cross-culturally fair intelligence measurements, which has led to school learners not performing according to their true potential. Lower and irregular test performance and results have more often been found among learners who receive lower quality of education (usually provided by schools located in less privileged environments). This yields inaccurate interpretations of school learners' intellectual abilities which lead to inappropriate diagnoses and interventions. Despite affirmative efforts from government and practitioners to help promote diversity, inclusion, and equalisation, having a lack of appropriate intelligence measures and effective cross-cultural assessment skills has hampered practitioners to conduct fair assessment practices for all.

This PhD research study aimed to develop a strategic guideline for experts, informing them on how to design intelligence measurement instruments that would be applicable and fair to school learners in ZA. Accompanying the design requirements were the recommended manner and context in which these instruments need to be employed when intellectually assessing the school learners. The developed strategic guideline was based on information provided by literature as well as experiences of practitioners regarding intelligence instrument development, adaptation, and/or administration to South African school learners. The strategic guideline is presented in the form of practical steps to be followed by experts when designing applicable, valid, reliable, and cross-culturally fair intelligence measurements to multidiverse school learners who reside and are schooled within various contexts in ZA. Practitioners employing the designed intelligence measurements should yield learner performances that are in line with their true intellectual abilities, from which appropriate diagnoses and interventions could be drawn. In conclusion, applying the strategic guideline, which evolved from this PhD research study, will make a positive contribution towards the

psychometric field of intellectual assessment in ZA; ethical and appropriate practices are possible through the use of cross-culturally appropriate intelligence measurements, which would not only empower and benefit both practitioners and South African school learners, but also contribute towards multi-ethnic equalisation.

References

- Beach, D. (2020). Multi-method research in the social sciences: A review of recent frameworks a way forward. *Government and Opposition*, 55(1), 163–182.
<https://doi.org/10.1017/gov.2018.53>
- Blackman, D., & Fitzgerald, A. (2006). The role of a multi-method research approach on critical research. In D. J. Kennedy & L. D. Milia (Eds.), *Proceedings of the 20th ANZAM Conference*. ANZAM. https://www.researchgate.net/profile/Deborah-Blackman/publication/228735913_The_role_of_a_multi-method_research_approach_on_critical_research/links/0912f50a2d8ee130da000000/The-role-of-a-multi-method-research-approach-on-critical-research.pdf
- Center on Standards and Assessment Implementation (CSIA). (2018). *Valid and Reliable Assessments CSAI Update*. WestEd. <https://files.eric.ed.gov/fulltext/ED588476.pdf>
- Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, 26(2), 120–123.
<https://uwe-repository.worktribe.com/output/937596>
- Clarke, V., & Braun, V. (2018). Using thematic analysis in counselling and psychotherapy research : A critical reflection. *Counselling and Psychotherapy Research*, 18(2), 107–110. <https://doi.org/10.1002/capr.12165>
- Cockcroft, K., & Sumaya, L. (2022). Culturally responsive neuropsychological assessment in South Africa. In F. Irani (Ed.), *Cultural diversity in neuropsychological assessment: Developing understanding through global case studies* (1st Ed.). Routledge.
<https://doi.org/10.4324/9781003051862-85>
- De Klerk, W., & Pretorius, J. (2019). Guideline for conducting critical reviews in psychology research. *Journal of Psychology in Africa*, 29(6), 645–649.
<https://doi.org/10.1080/14330237.2019.1691793>

- Department of Health (DoH, South Africa). (2018, Sept. 12). Health Professions Act, 1974 (Act no. 56 of 1974): Ethical rules of conduct for practitioners registered under the Health Professions Act (Notice 639). *Government Gazette*, 41900, p. 1–12.
<https://doi.org/http://dx.doi.org/9771682584003-32963>
- Department of Labour (DoL, South Africa). (1998, Oct. 19). Employment Equity Act, 1998 (Act no. 55 of 1998): Psychological testing and other similar assessments (Notice 1321). *Government Gazette*, 19370, p. 16.
- Foxcroft, C. D., Paterson, H., Le Roux, N., & Herbst, D. (2004). *Psychological assessment in South Africa: A needs analysis. The test use patterns and needs of psychological assessment practitioners: Final report. July*. Human Sciences Resource Council.
https://repository.hsrb.ac.za/bitstream/handle/20.500.11910/7498/1716_Foxcroft_Psy chologicalassessmentin%20SA.pdf?sequence=1
- Health Professions Council of South Africa (HPCSA). (2016). *Guidelines for good practice in the health care professions*. HPCSA. <http://www.hpcsa.co.za>
- International Test Commission (ITC). (2015). *International guidelines for practitioner use of test revisions, obsolete tests, and test disposal*. ITC.
https://www.intestcom.org/files/guideline_test_disposal.pdf
- International Test Commission (ITC). (2018). *ITC guidelines for the large-scale assessment of linguistically and culturally diverse populations*. ITC.
https://www.intestcom.org/files/guideline_diverse_populations.pdf
- Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *The American Journal of Occupational Therapy*, 45(3), 214–222.
<https://doi.org/10.5014/ajot.45.3.214>.

- Laher, S. (2022). Looking inward: Reflections on the African Journal of Psychological Assessment and the way forward [Editorial]. *African Journal of Psychological Assessment*, 4. <https://doi.org/10.4102/ajopa.v4i0.132>
- Laher, S., & Cockcroft, K. (2013). *Psychological assessment in South Africa: Research and applications* (S. Laher & K. Cockcroft, Eds.). Wits University Press. <https://doi.org/10.18772/22013015782.6>.
- Laher, S., & Cockcroft, K. (2014). Psychological assessment in post-apartheid South Africa: The way forward. *South African Journal of Psychology*, 44(3), 303–314. <https://doi.org/10.1177/0081246314533634>
- Laher, S., & Cockcroft, K. (2017). Moving from culturally biased to culturally responsive assessment practices in low-resource, multicultural settings. *Professional Psychology: Research and Practice*, 48(2), 115–121. <https://doi.org/10.1037/pro0000102>
- Lainson, K., Braun, V., & Clarke, V. (2019). Being both narrative practitioner and academic researcher: A reflection on what thematic analysis has to offer narratively informed research. *The International Journal of Narrative Therapy and Community Work*, 4, 86-98. <https://search.informit.org/doi/abs/10.3316/informit.846799716151082>
- Lucas, M. (2013). Neuropsychological assessment in South Africa. In S. Laher & K. Cockcroft (Eds.), *Psychological Assessment in South Africa: Research and applications* (1st ed., pp. 0–28). Wits University Press. <https://doi.org/10.18772/22013015782.6>
- Meiring, D. (2007). *Bias and equivalence of psychological measures in South Africa*. Labyrinth. <https://pure.uvt.nl/ws/portalfiles/portal/819923/202038.pdf>
- Mitchell, J. M., Tomlinson, M., Bland, R. M., Houle, B., Stein, A., & Rochat, T. J. (2018). Confirmatory factor analysis of the Kaufman assessment battery in a sample of

- primary school-aged children in rural South Africa. *South African Journal of Psychology*, 48(4), 434–452. <https://doi.org/10.1177/0081246317741822>
- Shuttleworth-Edwards, A. B. (2023). Cognitive test norms within multicultural, multiracial, multilingual, multi-opportunity South Africa: Clinical neuropsychological assessment and diagnosis. In G. J. Boyle, Y. Stern, D. J. Stein, B. J. Sahakia, C. J. Golden, T. M.-C. Lee, & S.-H. A. Chen (Eds.), *The SAGE Handbook of clinical neuropsychology: Clinical neuropsychology* (1st ed., pp. 94–107). SAGE. <https://doi.org/10.4135/9781529789539>
- Shuttleworth-Edwards, A. B., & Truter, S. (2023). *Cross-cultural cognitive test norms: An advanced collation from Africa*. Inter-Ed Publishers. <https://www.inter-ed.co.za/cross-cultural-cognitive-test-norms-an-advanced-collation-from-africa/>
- South African Government. (1996). *Constitution of the Republic of South Africa*. <https://www.gov.za/documents/constitution/chapter-2-bill-rights#9>
- South African Government. (2013, Nov. 26). Protection of Personal Information Act (4/2013): Protection of Personal Information Act (Proclamation no. 912 of 2013). *Government Gazette*, 37067, p. 2. https://www.gov.za/sites/default/files/gcis_document/201409/3706726-11act4of2013popi.pdf
- Spielman, R. M., Dumper, K., Jenkins, W., Lacombe, A., Lovett, M., & Perlmutter, M. (2022). *Introduction to Psychology*. Louisiana Library Network. <https://louis.pressbooks.pub/intropsychology>
- Thorne, S. (2016). *Interpretive description: Qualitative research for applied practice* (2nd. Ed.). Routledge.

Thorne, S., Kirkham, S. R., & O'Flynn-Magee, K. (2004). The analytic challenge in interpretive description. *International Journal of Qualitative Methods*, 3(1), 1–11.

<https://doi.org/10.1177/160940690400300101>

Van der Merwe, I., De Klerk, W., & Erasmus, P. (2022). Intelligence instruments applied to South African school learners: A critical review. *Frontiers in Psychology*,

13(853239), 1–11. <https://doi.org/10.3389/fpsyg.2022.853239>

Williams, G. (2019). *Applied qualitative research design*. ED-Tech Press.

<https://www.edtechpress.co.uk/details/applied-qualitative-research-design>.

SECTION 2: PHASES OF PHD RESEARCH STUDY

Phase 1 (Document 1)

Intelligence instruments applied to South African school learners: A critical review

Article Published

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Abstract

To establish reliability and validity of formal intelligence assessment instruments in a multicultural and multilingual society such as South Africa, context needs to be taken into consideration and existing psychological intelligence test instruments need to be surveyed carefully for cultural bias. The aim of this critical review of scientific literature was to critically appraise and synthesize data regarding intelligence instruments applied to South African school learners. The search initially yielded 405 studies of which 15 were finally included for thematic analysis. The following three main themes emerged from the included studies: Applicability of intelligence instruments administered to South African school learners; Contextual and demographic influences affecting performance on administered intelligence instruments; and Intellectual measuring instruments related to developmental and cognitive ability levels. It is recommended that the findings of this research study should be considered in the possible development of a strategic guideline to design an intelligence instrument applicable to South African school learners.

Keywords: assessment, cross-cultural, ethnic, intelligence, neuropsychology, school learners, South Africa.

Introduction

The assessment of South African school learners' cognitive abilities by means of psychological intelligence test instruments has remained controversial, even during the post-apartheid era, where western practices are continuously applied owing to a history of colonialism (Laher & Cockcroft, 2014). Viewed within the context of the country's unique history, psychologists have conducted irregular intelligence assessment practices, using unsuitable intelligence instruments, due to social and political discourse in South Africa (ZA) during the apartheid era (Laher & Cockcroft, 2014).

Psychologists in ZA have been administering assessment instruments to school learners from diverse, demographic populations, with the challenge of assessing within low-resourced contexts (Laher & Cockcroft, 2017). In addition to limited availability, these available instruments are mostly culturally biased, despite ongoing efforts from the post-apartheid government (Laher & Cockcroft, 2017). In line with the Employment Equity Act 55 (Department of Labour [DoL], 1998) as well as the inclusive education policy, psychologists have become aware of the need for linguistic- and cross-culturally relevant assessment practices in the post-apartheid ZA, however, struggle to do so with the lack of ethnically appropriate assessment instruments (Foxcroft et al., 2004). When psychologists assess school learners for diagnostic and scholastic placement reasons, the intelligence test instrument is usually included in the battery of selected assessment instruments. Laher and Cockcroft (2017) stated the imperative need for South African psychologists to become highly resourceful, culturally, and ethically aware by applying emic assessment practices that will be appropriate, applicable, and fair towards the school learners being assessed.

Legislation bringing Changes in the New Democratic, Post-apartheid Republic of South Africa

After the first democratic election in 1994, ZA's new constitution, which included the Bill of Rights, brought about ethnically fair legislations to cater for a multifaceted, diverse society (Meiring, 2007; Shuttleworth-Edwards et al., 2013). This affected the psychological assessment practices in ZA, where assessments had to be administered within various contexts, on multicultural and multilingual populations, using mainly western-normed tests. South African school learners present a vast diversity in its population, providing it a characteristic of various demographic differences. Other than multilinguistic, multi-ethnic and cultural diversities, differences such as quality of education, access to quality resources and services, language proficiency, as well as literacy levels that stemmed from vast socio-economic status (SES) inequalities, have provided multiple challenges to psychological assessment practices and created various assessment environments (Laher & Cockcroft, 2017; Shuttleworth-Edwards, 2016). Thus, in administering intelligence assessment on South African school learners of such a diverse demographic population, presented various questions and challenges.

Shortage of Appropriate and Culture-fair Intelligence Instruments to South African School Learners

Consequently, the Human Sciences Research Council (HSRC) investigation of behaviours and needs of test practitioners in ZA, the concerns of outdated, inapplicable psychological tests were raised, accompanied by an urgent appeal to develop psychological tests that are reliable, valid and applicable to the South African population (Foxcroft et al., 2004). Mitchell et al. (2018) mentioned the lack of appropriate and culture-fair intelligence instruments to South African school learners. Laher and Cockcroft (2014, pp. 308-309) encouraged assessment and test development practitioners to make active contributions

towards “equity and redress” by accommodating “diversity in terms of language, educational background and SES when developing and administering psychological tests”. In order to ensure appropriate and fair psychological assessments of South African school learners from diverse cultures in poorly resourced contexts against a background of social inequality, practitioners need to be “highly resourceful as well as culturally sensitive and ethically aware” (Laher & Cockcroft, 2017, p. 115). Visser and Viviers (2010) stated the obligated necessity of South African psychologists aligning their current practices with the promulgated requirements stated in the Employment Equity Act 55, Section 8 (DoL, 1998). To accomplish this, there exists a need for development of new intelligence assessment instruments and validation of existing ones, which are applicable to all the multifaceted diversity groups found in the South African society. Referring to the South African heterogeneous populations and assessment contexts, Shuttleworth-Edwards (2016) expressed the pressing need to attend to these complexities and to find ways of achieving adequate culture-specific psychological assessment practices.

The choice of individually administered intelligence tests, that South African practitioners assessing school learners presently have, range from the limited and outdated few locally developed intelligence tests for school learners to the western-developed, imported intelligence tests that have been standardized according to South African norms (Laher & Cockcroft, 2017; Shuttleworth-Edwards, 2016). In their edited book: ‘Psychological assessment practices in South Africa: Research and applications’, Lahar and Cockcroft (2013) listed and discussed various intelligence tests that are administered on school learners in ZA. These included the two local intelligence tests, the 1991 released Senior South African Individual Scale–Revised (SSAIS-R; Van Eeden, 1991) for ages 7 years to 16 years 11 months, and the 1981 released Junior South African Individual Scale (JSAIS; Madge, 1981), assessing children 3 years to 7 years 11 months. The list also included

a few imported and locally normed tests of intelligence and cognitive ability, namely the Wechsler Intelligence Scale for Children-fourth edition (WISC-IV; Wechsler, 2003), the Kaufman Assessment Battery for Children-second edition (KABC-II; Kaufman & Kaufman, 2004), and the DAS-Naglieri Cognitive System (CAS; Naglieri & Das, 1997).

Problem Statement

Lucas (2013) mentioned the lack of locally standardized intelligence tests and speculated that this was due to limited funds and the HSRC changing their role of being the major developing organization. He advised that South African test developers should take hands with international test developers, who have experience in developing high quality tests, and aim to overcome the challenges brought through attempting to develop an assessment instrument for a multicultural society. Shuttleworth-Jordan (1996) advocates norming of commonly employed, internationally based cognitive tests for use in the South African context, with the benefit of a long history of test refinement through clinical and research practices. Therefore, we need to “think globally, but act locally” (Laher, 2019, p. 2). Based upon above-mentioned statements, there exists a need for designing intelligence instruments that are applicable to the multifaceted, demographically diverse group of school learners found in ZA.

Goal of the Study

Hence, the aim of this critical review was to critically appraise and synthesize data regarding intelligence instruments applied to South African school learners. We pursued to address the following question: *What does literature state regarding intelligence assessment instruments applied to South African school learners?*

Method of Investigation

Research Design

A critical review (De Klerk & Pretorius, 2019) was applied to address the research question, and not a systematic review, due to time constraints as well as the critical purpose of this specific review study. The critical review allowed the researchers to not only search for and describe scientific literature from a variety of resources, but also venture beyond to critically assess the effectiveness and quality of the literature presented (Grant & Booth, 2009).

Search Approach

A step-by-step literature search was performed in August 2021 using the electronic databases EBSCOhost, Academic Search Complete, E-Journals, PsycArticles, PsycInfo, Sabinet African Journals, ScienceDirect, Google Scholar, as well as South African Theses and Dissertations. A combination of keywords used in the search included cognition terms ('intelligen*' OR 'IQ' OR 'cognit*' OR 'neuropsycholog*'), instrument terms ('test*' OR 'assess*' OR 'instrument*'), demographic terms ('learner*' OR 'schola*' OR 'child*' OR 'adolescen*') as well as a geographic term ('South Africa*'). Boolean operators such as AND, OR and NOT were implemented to help clarify the search. Keywords found in searched texts were applied to search additional research studies.

Although this search reviewed peer reviewed works (written in English) from all eras, it predominantly focused on more recent (not older than 10 years) literature works regarding intelligence assessment instruments applied to South African school learners. The search initially yielded 405 studies of which 15 were finally included. Studies were screened and assessed for eligibility by three independent reviewers, namely the primary reviewer (lead author) and co-reviewers (second and third authors), initially by title and abstract, then by full text, according to inclusion and exclusion criteria. Any conflicts were resolved through

consensus. Figure 1 presents the four-step search strategy approach as well as inclusion/exclusion criteria. Table 1 provides a summary of the data extracted.

Figure 1: Database Search Flow Chart

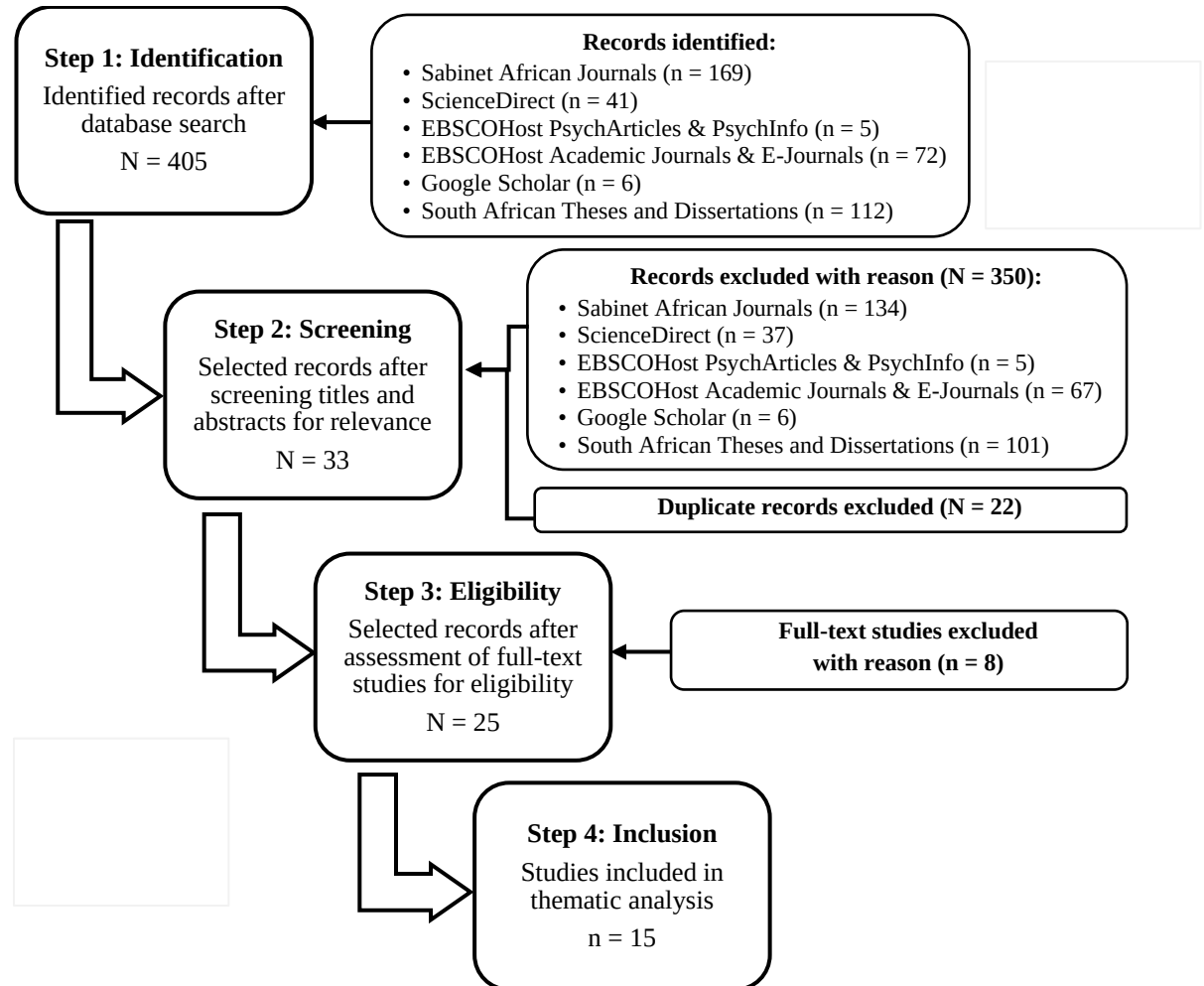


Table 1*Data Extraction Table*

Study, Aim, Tests and Intelligence Measured	Sample and SES Status	Main Results
<i>Dissertation (Master of Arts in Psychology: Research):</i> August, (2017). <i>Aim:</i> The research aimed to establish psychometric normative screening data based on the Raven's Coloured Progressive Matrices (CPM). <i>Tests:</i> The Raven's CPM. <i>Intelligence measured:</i> Both fluid and crystallized intelligences.	<i>Sample:</i> Grade 1 – 7 school learners (n=388); female (39.95%), male (60.05%); Afrikaans (79%), Xhosa (10%), English (9%); from schools (amount not stated) in the Nelson Mandela Metropolitan Area. <i>SES status:</i> School learners with learning barriers.	<i>Results:</i> The results of the study indicated that there was a proportional relationship between age and test performance. Gender differences were found where the males outperformed the females. There was a significant difference in the Raven's CPM test performance with respect to the grade levels of the school learners.
<i>Minor Dissertation (Magister Educationis in Educational Psychology):</i> Blake (2011). <i>Aim:</i> To gain an understanding of the school learners' verbal ability as well as to investigate the quality of the test items on the verbal scale of the translated Sesotho version of the Junior South African Individual Scales (JSAIS). <i>Tests:</i> JSAIS (translated Sesotho version). <i>Intelligence measured:</i> Crystallized intelligence.	<i>Sample:</i> Grade 1 Sesotho school learners (n=29); female (58.62%), male (41.38%); aged 5-7 years, at a primary school in Soweto. The school itself formed part of a greater umbrella research project partnered by the University of Basel Switzerland and the Centre for Education Practice Research at the University of Johannesburg (UJ). <i>SES status:</i> Low-income school learners.	<i>Results:</i> The results show how the Rasch model can provide an in-depth understanding about the functionality and effectiveness of an adapted measure in terms of item difficulty and the participants' underlying abilities. This study has revealed that the Verbal Intelligence Quotient Eight (VIQ8) scale of the translated JSAIS is a valid and reliable measure, but requires further adaptations in order to make it a suitable instrument for Sesotho Foundation Phase school learners.
<i>Dissertation (Master of Education in Educational Psychology):</i> Cassoojee (2020). <i>Aim:</i> The main aim of this study was a comparative analysis of the test performance of South African school learners on the indexes/scales of the Wechsler Intelligence Scale for Children - Fifth Edition (WISC-V) and the Kaufman Assessment Battery for Children - Second Edition (KABC-II), so as to determine whether these indexes/scales yield	<i>Sample:</i> Grades 4-8 school learners (n=50); female (38%), male (62%); 10-14 years old; from a private remedial school in the South of Johannesburg; presenting with specific learning difficulties (SLD), excluding school learners with severe cognitive/developmental delays, severe physical/neurological difficulties and/or severe emotional or other disorders.	<i>Results:</i> The research conclusion was that although these tests show good construct validity, the score discrepancy is significant and they can therefore not be used interchangeably in the South African context.

Study, Aim, Tests and Intelligence Measured	Sample and SES Status	Main Results
non-significantly different average scores when administered to referred school learners. <i>Tests:</i> WISC-V and KABC-II. <i>Intelligence measured:</i> Both fluid and crystallized intelligences.	<i>SES status:</i> School learners with learning barriers.	
<i>Article:</i> De Beer (2005). <i>Aim:</i> The development of a dynamic test for the measurement of learning potential – the Learning Potential Computerised Adaptive Test (LPCAT). <i>Tests:</i> LPCAT. <i>Intelligence measured:</i> Fluid intelligence.	<i>Sample:</i> Grade 9 and Grade 11 school learners (n=2454); female (49.95%), male (50.05%); Black (49%), White (27%), Coloured (24%); schools (n=41); Provinces (n=3). <i>SES status:</i> Diverse socio-economic and educational backgrounds.	<i>Results:</i> Development of the LPCAT proved to be a psychometrically sound and practically useful tool for the measurement of learning potential in multicultural contexts.
<i>Dissertation (Psychiatry: Doctor of Philosophy):</i> Ferrett (2011). <i>Aim:</i> To ascertain whether cognitive tests developed in settings outside the Western Cape urbanized area have valid application for clinical and research purposes in that area. <i>Tests:</i> The Children’s Color Trails Test (CTTT), Children’s Memory Scales (CMS): Numbers Subtest, CMS: Stories Subtest, CLOX Test, Grooved Pegboard Test (GPT), The Edinburgh Handedness Test (EHI), Maj’s Auditory Learning Test (MAVLT), Rey-Osterrieth Complex Figure Test (ROCFT), Stroop Color-Word Test – Golden Version (SCWT), Tower of London (ToL), Verbal Fluency Tests – Phonemic and Semantic, Wechsler Abbreviated Scale of Intelligence (WASI), Wechsler Intelligence Scale for Children 4th UK Edition (WISC-IV): Coding Subtest. <i>Intelligence measured:</i> Both fluid and crystallized intelligences.	<i>Sample:</i> Afrikaans (43.3%) - and English-speaking (56.7%) adolescents (n=215); female (54.4%), male (45.6%); Coloured (68.8%), White (31.2%); aged between 12 and 15 years; with between 6 and 10 years of completed education; recruited from schools (n=47) in the greater Cape Town metropolitan region. <i>SES status:</i> Diverse socio-economic and educational backgrounds.	<i>Results:</i> This dissertation provided 1) methodological guidelines to assessing, adapting, translating, and norming cognitive tests, and 2) stratified norms for a selection of cognitive tests, for a narrowly defined population.
<i>Article:</i> Jansen and Greenop (2008). <i>Aim:</i> The study used the K-ABC in a longitudinal	<i>Sample:</i> Children living in Soweto (n=199); at 5 years and 10 years; female (51%), male (49%);	<i>Results:</i> Employing the K-ABC as a theory driven assessment tool with a South African population

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application in order to explore the robustness of the factor structure of the K-ABC for the same group of children at two developmental points (5 years and 10 years) in time. <i>Tests:</i> K-ABC. <i>Intelligence measured:</i> Both fluid and crystallized intelligences.	isiZulu (42%), Sotho (26%) Tswana (16%), Xhosa (6%), Venda (6%), and Tsonga (4%). <i>SES status:</i> Changes in the economic circumstances were reflected at the two time stages. At 5 years, 73% lived in shared housing, at 10 years 41% lived in shared housing.	is feasible and useful.
<i>Article:</i> Jinabhai et al. (2004). <i>Aim:</i> This study reports on the application and interpretation of a selected battery of mental ability tests among isiZulu school learners and the methodological and analytical issues that need to be addressed. <i>Tests:</i> CPM, Auditory Verbal Learning Test (AVLT), Symbol Digit Modalities Test (SDMT), Young's Group Mathematics Test (GMT). <i>Intelligence measured:</i> Both fluid and crystallized intelligences.	<i>Sample:</i> IsiZulu Grade 3 school learners (n=806); female (43.9%), male (56.1%); ages 8-11; rural primary schools (n=11); Vulamehlo Magisterial District, Kwazulu-Natal. <i>SES status:</i> Rural community.	<i>Results:</i> Significant gender differences were found in the test scores, and the mean scores of isiZulu school learners in this study were lower than those reported in other studies.
<i>Article:</i> Levert and Jansen (2001). <i>Aim:</i> Explores Piagetian and Lurian approaches to the assessment of neurocognitive processes of previously disadvantaged Black school learners attending English medium schools in the Johannesburg area. <i>Tests:</i> Home Screening Questionnaire (HSQ), Clinical Neuropsychological Evaluation Instrument, Piagetian Tasks, and Draw-a-Person (DAP) Test. <i>Intelligence measured:</i> Fluid intelligence.	<i>Sample:</i> Historically disadvantaged Black school learners (n=50) in English medium schools (n=3) in Johannesburg at 7 years old; with learning problems (n=27) and without learning problems (n=23); female (52%), male (48%); Southern Sotho or Northern Sotho (57%), isiZulu (26%), and Venda and Xhosa (13%). <i>SES status:</i> Diverse socio-economic and educational backgrounds.	<i>Results:</i> Piagetian and Lurian approaches can offer greater insight into South African school learners' cognitive levels and task performance.
<i>Minor Dissertation (Magister Educationis in Educational Psychology):</i> Mawila (2012). <i>Aim:</i> To investigate the quality of the test items on the sub-scales of the performance subtest of the translated Sesotho version of the JSAIS (GIQ-8).	<i>Sample:</i> Sesotho Grade 1 school learners (n=42) in a school in Soweto, who come from linguistically, culturally and socio-economically diverse backgrounds. Female and male were not specified.	<i>Results:</i> Results suggest the Form Board subtest of the JSAIS (GIQ-8) is not a valid measure for the Sesotho participants whereas Absurdities A and B is likely to be a valid measure for this population. However, further adaptation that

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<i>Tests:</i> JSAIS (translated Sesotho version). <i>Intelligence measured:</i> Fluid intelligence.	<i>SES status:</i> Diverse socio-economic and educational backgrounds.	include omission of redundant items and redesigning of pictures, should make it a suitable instrument for participants in this particular context.
<i>Article:</i> Mitchell et al. (2018). <i>Aim:</i> To establish the reliability and validity of the K-ABC-II. <i>Tests:</i> K-ABC-II (translated isiZulu version). <i>Intelligence measured:</i> Both fluid and crystallized intelligences.	<i>Sample:</i> HIV-uninfected primary school-aged children (n=376) in rural Northern KwaZulu-Natal between 7–11 years old; female (65%), male (35%). <i>SES status:</i> Rural community.	<i>Results:</i> With translation and the inclusion of supplementary sub-tests, the K-ABC-II has good reliability and maintains its original structure when used in this context.
<i>Minor Dissertation (Magister Educationis in Educational Psychology):</i> Naicker (2013). <i>Aim:</i> To apply a Rasch Analysis to the Numerical Intelligence Quotient Eight (NUM Scale) of an isiZulu translation of the JSAIS to determine the quality of the items in relation to the ability of participants in the sample group. <i>Tests:</i> JSAIS (translated isiZulu version). <i>Intelligence measured:</i> Both fluid and crystallized intelligences.	<i>Sample:</i> Grade 1 isiZulu school learners (n=34); female (47.06%), male (52.94%); at a school in Soweto, an urban area within Johannesburg with predominance of Black persons, where many parts are socio-economically disadvantaged and speaking varying dialects. The longitudinal research project is a collaborative effort between the University of Basel, Switzerland and the Centre for Education Practice Research (CEPR) at the University of Johannesburg (UJ). <i>SES status:</i> Socio-economically disadvantaged.	<i>Results:</i> Results of the study show that the data generated varied in its fit of the Rasch Model. Results also confirmed that the numerical subtests of the Number and Quantity are valid measures of the construct for which it was designed; but further studies on the isiZulu translated JSAIS are recommended, with larger samples, reduced cultural loading on items, as well as consideration of found misfitted items, item difficulty and item overlap.
<i>Article:</i> Reid et al. (2002). <i>Aim:</i> Whether results obtained with the PASS (Planning, Attention, Simultaneous and Successive) model of intelligence could provide insight into the cognitive functioning of South African school learners. <i>Tests:</i> Cognitive Assessment System (CAS), Woodcock Diagnostic Reading Battery (WDRB), and school marks. <i>Intelligence measured:</i> Both fluid and crystallized intelligences.	<i>Sample:</i> Grade 6 Black and English second language school learners (n=32) at an urban public school in a Northern suburb of Johannesburg. Female and male not specified. <i>SES status:</i> Not specified.	<i>Results:</i> The results indicated that the PASS model for intelligence correlates with reading and scholastic achievement in the South African context.

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<i>Book Chapter:</i> Shuttleworth-Edwards et al. (2013). <i>Aim:</i> Investigating the UK-version WISC-IV test performance with the objective of producing comparative normative indications for the ten core subtest scores, four Index scores and the Full Scale Intelligence Quotient (FSIQ) score that could be utilised in typical clinical situations as they currently apply in the South African context. <i>Tests:</i> WISC-IV-UK. <i>Intelligence measured:</i> Both fluid and crystallized intelligences.	<i>Sample:</i> Grade 7 school learners (N = 69); female (47.83%), male (52.17%); 12-13 years old; White (34.78%), Black (34.78%), Coloured (30.44%); Afrikaans (47.83%), Xhosa (34.78%), English (17.39%); in Makhanda (previously Grahamstown), Gqeberha (previously Port Elizabeth) and Cape Town. <i>SES status:</i> Diverse socio-economic and educational backgrounds.	<i>Results:</i> The data in respect of the WISC-IV, while also in respect of small sample numbers, gain validity in that the sample is well stratified for the relevant socio-cultural variables. Further, clear replication of the adult findings in this child-oriented research, of a downward continuum of IQ test performance in association with poorer quality of education rather than ethnicity per se, provides cross-validation for both the adult and child research probes.
<i>Minor Dissertation (Magister Educationis in Educational Psychology):</i> Teixeira (2011). <i>Aim:</i> To apply a Rasch Analysis to the VIQ-8 scale of an isiZulu translation of the JSAIS to determine whether it would be a reliable and valid means of assessing the verbal cognitive functioning and development of school learners at a school in the South African context. <i>Tests:</i> JSAIS (translated isiZulu version). <i>Intelligence measured:</i> Crystallized intelligence.	<i>Sample:</i> Grade 1 isiZulu school learners (n=26); female (57.69%), male (42.31%); ages 5-7 years old; at a school in Soweto. Research was conducted at the school under the auspices of the Soweto Panel Research Programme. <i>SES status:</i> Not specified.	<i>Results:</i> The analysis of the results suggested that on the whole the three sub-tests fitted the Rasch Model well.
<i>Dissertation (Master of Social Science in Psychology):</i> Van Wyhe (2012). <i>Aim:</i> To describe the development of a culturally and linguistically adapted version of the WASI suitable for use in English and Afrikaans 12-15 years old first-language speakers. <i>Tests:</i> Demographic and Socio-economic Questionnaire, Marin Acculturation Scale (MAS), and WASI-SA (English and translated Afrikaans versions). <i>Intelligence measured:</i> Both fluid and crystallized intelligence	<i>Sample:</i> School learners (n=200); female (53%), male (47%); 12-15 years old; Afrikaans (53%), English (47%); Western Cape. <i>SES status:</i> Diverse socio-economic and educational backgrounds.	<i>Results:</i> This study provides valuable guidelines for collection and use of normative data for research and clinical purposes in ZA.

Procedure

This research study (a critical review) received approval from the Health Research Ethics Committee (NWU-00191-21-A1) of the Faculty of Health Sciences, North-West University, ZA. The primary reviewer (lead author) performed an independent search, while the second reviewer (second author) monitored the review process by acting as co-analyst of extracted data. The seven-step critical review guideline, as suggested by De Klerk and Pretorius (2019), was followed to ensure optimal data gathering. The PRISMA and PICO approaches were not implemented in this critical review study, rather we implemented a simple analytical framework (Grant & Booth, 2009) – Search, Appraisal, Synthesis and Analysis (SALSA) – for the main purpose of this critical review study.

Data Analysis

The thematic data analysis method was applied to analyse the extracted data (Clarke & Braun, 2013, 2018). First, the primary reviewer (lead author) familiarized herself with the data by reading and re-reading the identified literature. Second, the lead author identified codes for use in creating themes by sorting the codes according to a pattern. Third, we (lead author and two co-authors) defined and named the identified themes for the findings statement. Lastly, we produced the written report (this critical review article).

Findings and Discussion

The following three main themes emerged from the included studies: (i) Applicability of intelligence instruments administered to South African school learners; (ii) Contextual and demographic influences affecting performance on administered intelligence instruments; and (iii) Intellectual measuring instruments related to developmental and cognitive ability levels. Table 1 provides a summary of included studies. We discuss these themes below.

Theme 1: Applicability of Intelligence Instruments Administered to South African School Learners

It was evident from all the studies that intelligence assessment instruments administered to South African school learners from diverse, demographic populations need to be applicable to that particular population subgroup, in order to be valid, reliable, and fair (August, 2017; De Beer, 2005; Ferrett, 2011; Jansen & Greenop, 2008; Jinabhai et al., 2004; Levert & Jansen, 2001; Mawila, 2012; Mitchell et al., 2018; Reid et al., 2002; Shuttleworth-Edwards et al., 2013; Teixeira, 2011; Van Wyhe, 2012). When administering imported western-developed intelligence instruments to South African school learners, appropriate and updated norms need to be applied, based on continuous normative studies conducted on an equivalent population group and within a similar context as the testees (August, 2017; Ferrett, 2011; Shuttleworth-Edwards et al., 2013; Van Wyhe, 2012). The international theory driven K-ABC and K-ABC-II have proven to be feasible, valid, reliable, and appropriate intelligence assessment instruments when administered to multicultural South African school learners (Jansen & Greenop, 2008; Mitchell et al., 2018). The research study by Mitchell et al. (2018) found the K-ABC-II to have good construct validity and reliability when applied to a South African school learner sample, provided that it is translated, the battery maintains its original structure (allowing insight into performance on various cognitive domains), and applicable supplementary subtests are included (to strengthen the measurement of the Planning subscale) in the assessment.

A few attempts have been made to investigate, adapt, update, and norm the locally developed intelligence test JSAIS, however not without significant challenges. In the research studies conducted by students at the University of Johannesburg, the researchers respectively administered Sesotho-translated and isiZulu-translated versions of the JSAIS to South African school learners and employed the Rasch model to determine item accuracy (do items

measure what they are intended to measure) and applicability (Blake, 2011; Mawila, 2012; Naicker, 2013; Teixeira, 2011). Mawila (2012), who administered the Sesotho-translated version of the JSAIS Performance subscales found that it could be a valid measure for South African school learners if foreign, redundant, and outdated items are adapted and translation challenges (many concepts could for instance not be accurately translated) are addressed. Teixeira (2011) found the isiZulu-translated JSAIS Verbal subscales to be a valuable intelligence assessment instrument as it still held sound psychometric properties, however needed to be updated, adapted, and re-normed to adequately fit the South African school learner population. Similar findings from the Sesotho-translated JSAIS Verbal subscales disclosed it as a valid and reliable intelligence measure, however with the recommendation of needed adaptations to make it suitable for the South African school learners being assessed (Blake, 2011). Naicker (2013) investigated the Numerical scales of an isiZulu-translated JSAIS and found the included numerical subtests to be valid measures of the constructs for which they were designed, but further similar studies are recommended, with larger samples, reduced cultural loading on items, as well as consideration of found misfitted items, item difficulty, and item overlap. Moloi (2014) conducted a research study investigating the quality of various test items found in the isiZulu-translated JSAIS Global Intelligence scales, with the purpose of determining how they can be improved to be an appropriate measure for South African school learners. Findings included themes of language and numerical issues derived from test translation as well as a need to revise and update pictures and other visual data to be more relatable and familiar to the group being tested (Moloi, 2014).

In reaction to the challenges of assessing South African school learners from multicultural contexts, the LPCAT was locally developed and proved to be a fair and psychometrically sound non-verbal intelligence test, as it was developed and standardized

using multicultural samples and yields information over a wide range of abilities (De Beer, 2005).

Theme 2: Contextual and Demographic Influences Affecting Performance on Administered Intelligence Instruments

Some reviewed studies noted significant differences on intelligence assessment results among various South African school learner subgroups, and related performance differences to contextual and demographic influences (August, 2017; De Beer, 2005; Ferrett, 2011; Jinabhai et al., 2004; Levert & Jansen, 2001; Mitchell et al., 2018; Shuttleworth-Edwards et al., 2013; Van Wyhe, 2012). Some studies found that English school learners from an advantaged educational background performed at the highest level of all the subgroups tested (Ferrett, 2011; Shuttleworth-Edwards et al., 2013; Van Wyhe, 2012). The normative study by Shuttleworth-Edwards et al. (2013) administering the WISC-IV-UK to school learners from advantaged and disadvantaged quality of education revealed the following findings: the advantaged (private schooling) English Caucasian (White) subgroup received the highest mean scores, followed by the advantaged (private and Model C schooling) African (Black) Xhosa subgroup as well as the advantaged (non-private, Model C schooling) Caucasian Afrikaans subgroup, and subsequently the disadvantaged education subgroups performing the lowest with the African Xhosa scoring within borderline range and the Coloured Afrikaans within the extremely low range. The researchers concluded by stating that the WISC-IV performance revealed a clear downward continuum of intelligence performance in relation to poorer quality of education, rather than ethnicity, and cross-validated this finding with other similar South African research studies on Wechsler intelligence scales (see Brown, 1998; Shuttleworth-Edwards et al., 2004; Zindi, 1994). Van Wyhe (2012) found South African school learners from disadvantaged quality of education performing more poorly than the school learner subgroup from advantaged quality of education across all subtests and index

scores of the WASI, regardless of home language. A normative study by August (2017) found an upward continuum of intelligence performance on the CPM in relation to increased age/grade levels as well as gender differences in test performance. These findings were in alignment with other similar local and international normative studies conducted on subgroups with differing geographic and demographic features (see Knoetze et al., 2005; Linstrom et al., 2008; Raven et al., 1990).

A trend of South African school learners performing more often in a lower range compared to international norms, were identified by many of the studies reviewed (August, 2017; Ferrett, 2011; Jinabhai et al., 2004; Mitchell et al., 2018; Shuttleworth-Edwards et al., 2013; Van Wyhe, 2012). These studies attributed the inferior performance to contextual and demographic differences, specifically language differences (school learners being assessed in a second/third language or receiving translated test instructions, where certain concepts could be misinterpreted or ‘lost in translation’) and disadvantaged quality of education which resulted from previous apartheid policies and inferior SES backgrounds (August, 2017; Ferrett, 2011; Jinabhai et al., 2004; Mitchell et al., 2018; Shuttleworth-Edwards et al., 2013; Van Wyhe, 2012). Based on findings from a study administering a selected battery of imported intellectual tests to South African school learners from rural disadvantaged primary schools and referring to a statement made by Spreen and Strauss (1991), Jinabhai et al. (2004) reported that the lower mean mental ability scores found, compared with other local and international studies’ performances, may be invalid comparisons as the various school learner subgroups have educational and cultural differences (Jinabhai et al., 2004). Hypotheses for lower performances included disadvantaged quality of education, possible lack of familiarity with psychometric testing tasks, as well as non-verbal tests that could be culturally loaded with unfamiliar concepts (Jinabhai et al., 2004). Van Wyhe (2012) reasoned that their study’s findings of lower intelligence performance of South African school learners

with disadvantaged schooling, compared to American counterparts, could be due to disadvantaged education and experienced ‘language conflict’ (bilingualism and multilingualism possibly affecting cognitive and linguistic abilities).

Some reviewed studies found that English school learners from an advantaged educational background performed at the same level or even slightly better than their American counterparts (Shuttleworth-Edwards et al., 2013; Van Wyhe, 2012). Mitchell et al. (2018) researched the intellectual performance of South African school learners by administering the K-ABC-II and found lower mean scores on the Simultaneous and Planning subscales as opposed to the Learning and Sequential subscales. The researchers gave probable explanations to this trend by identifying possible test-related factors of timed-points and test content where school learners’ test approach and performances could differ depending on their socio-demographic characteristics, SES, as well as test and school exposure (Mitchell et al., 2018). Referring to the tendency to link concepts of ‘intelligence’ and ‘responsibility’ in African contexts, the researchers attributed timed points lost to school learners probably taking their time to consider tasks carefully (acting responsibly) instead of completing them swiftly, and noted possible bias on test content such as use of certain shapes, forms or pictures that could be unfamiliar due to lack of previous exposure (Mitchell et al., 2018).

Theme 3: Intellectual Measuring Instruments Related to Developmental and Cognitive Ability Levels

The South African developed LPCAT proved to be a psychometrically sound, culturally fair, time-efficient, and practically useful intelligence instrument which lessens the impact of SES, cultural or educational influences of persons from multicultural contexts by measuring non-verbal fluid intelligence (De Beer, 2005). This dynamic assessment instrument was developed, standardized and validated using multicultural samples, and in

applying item response theory principles (where item parameters do not depend on the ability level of the testees, but are a property of the item) and computerized adaptive testing technology allows for more accurate measurement of difference scores, making it very applicable to South African school learners (De Beer, 2005).

The research study by Mitchell et al. (2018) administering the K-ABC-II to South African school learners, found that they received lower means on the Simultaneous and Planning subscales as opposed to the Learning and Sequential subscales; researchers referred to a similar finding which occurred in another research study on an Indian population (Malda et al., 2010, as cited in Mitchell et al., 2018). In addition to identified test-related factors, researchers hypothesized skilled-related factors as possible attributes to the lowered performance, which included underdeveloped cognitive executive functioning skills. Researchers however reflected on the study's limitation of not examining the effect that environmental factors could have had on the emergence of executive functioning skills or how these possibly influenced the school learners' performance (Mitchell et al., 2018). Based on the study findings by Mitchell et al. (2018) noting that the K-ABC-II had high reliability and construct validity when administered in the South African context, Cassoojee (2020) conducted a comparative analysis of South African school learner test performance on the theoretically similar indexes/scales of the UK normed WISC-V and K-ABC-II. The findings indicated good construct validity with strong correlations between most of the similar indexes and scales; specifically, a strong correlation between the Working Memory Index (WMI) and the Knowledge Scale (Gc) suggested an important association between working memory and crystalized (prior learning) intelligence (Cassoojee, 2020).

Based on the Piaget-inspired PASS (Planning, Attention, Simultaneous and Successive) model, the CAS was administered to South African school learners which revealed findings of a significant correlation between the school learners' cognitive processes

assessed by the CAS, as well as their reading ability (measured by the WDRB) and school marks (Reid et al., 2002). Findings of CAS as a valid and fair intelligence instrument when applied to South African school learners seemed promising but was not confirmed in this research study by Reid et al. (2002); nevertheless, the findings provided pivotal insight into understanding the school learners' cognitive processes involved during intelligence assessment which were directly linked to the success or failure of their reading performance (a required scholastic skill) as well as school performance. Levert and Jansen (2001) introduced Piagetian tasks (measuring developmental cognitive levels) and Lurian tasks of reading and writing, arithmetic, language, visual, mnestic, intelligence, and motor functioning (similar to required formal scholastic skilled tasks) to assess the intelligence of two subgroups, a Learning Problems (LP) group and a No Learning Problems (NLP) group. The LP group was found to perform at Piaget's Preoperational stage of cognitive development (with non-attained scores on tasks of conservation and seriation, but intermediate level mean scores on classification tasks) which related significantly to their performance on Lurian tasks (Levert & Jansen, 2001). Levert and Jansen (2001) found the NLP functioning at higher maturation levels compared to the LP group, namely within the beginning stages of the Piagetian Concrete Operational stage (with intermediate level mean scores for tasks of seriation, classification and conservation), which linked to the mastery of most Lurian tasks (except for presenting slight difficulties in expressive language, mnestic processes and intelligence tasks).

Implication for Intelligence Assessment within the South African Multidiverse Context

In order to keep updated and suitable intelligence tests for all South African school learner subgroups, normative studies need to continue across the whole country (August, 2017; De Beer, 2005; Ferrett, 2011; Jinabhai et al., 2004; Levert & Jansen, 2001; Mitchell et al., 2018; Shuttleworth-Edwards et al., 2013; Van Wyhe, 2012).

Most of the subtests in the locally developed JSAIS were found to be valid intellectual assessment measures on South African school learner subgroups, but with the recommendation of refinement in the translation efforts as well as updating, adapting, and standardizing this instrument with norms that are representative of the South African population (Blake, 2011; Mawila, 2012; Moloi, 2014; Naicker, 2013; Teixeira, 2011). Moloi (2014) gave various examples of inapplicable test item content that needs modification. Such as translation errors or difficulties caused by vocabulary used out of context (changing the meaning of the word), use of terminology other than the school learner's dialect, use of terms not applied in school (e.g. mathematical terms), difficulty when translating certain items such as certain riddles or the 'rhymes with' questions, or total untranslatability. Some questions and illustrations were found not to be user-friendly, outdated, unfamiliar (from a western context), not age appropriate (e.g. item 32 could be too detailed for young children), ethnically biased (e.g. Performance scale item 32 with a picture of a boat; or Verbal scale item 27 stating that 'Dogs are tame and wolves are...?' could be misleading where dogs were perceived by many participants as things to be afraid of). These findings were confirmed by Theron (2013) who suggested that certain concepts in the JSAIS are foreign to school learners who differ in their background, language, or ethnicity with examples such as: using the word 'freckles' in the Vocabulary subtest to a non-Caucasian child; saying phrases like 'in the veld', 'in a vase' 'in the dining room' in the Story Memory subtest to a child with a different cultural heritage. In addition, caution was drawn towards certain questions, words or phrases found in the JSAIS subtests Ready Knowledge, Word Association or Vocabulary that could trigger memories of loss and/or crime, as many South Africans have experienced, that could provide inaccurate findings (Theron, 2013). Foxcroft (2011, p. 12) noted one challenge when aspiring to translate tests into an indigenous language, is finding a bilingual expert who does not simply translate on a word-for-word basis, but one who comprehends the

“idiosyncrasies and subtle nuances of both languages as well as the social meanings attached to words and phrases”. Moloi (2014) recommended both local educators (speaking the same language as the tested subgroup) and psychologists review and adapt the content of the intelligence test instrument for validity, language applicability, and cultural appropriateness before administering it to the South African school learner subgroup. Efforts of suitable test adaptation and standardization would need, however, a lot of time and resources to conduct.

The time-efficiency and applicability of the LPCAT instrument (De Beer, 2005) could address the lack of resources for intellectual testing in ZA and reach more school learners to develop sufficient normative data. With the purpose of assessing school learners fairly, especially those school learners from a deprived quality educational background, it is recommended that intellectual instruments such as the LPCAT be selected, since it applies fluid intelligence as opposed to crystallized intelligence; fluid intelligence assesses the reasoning ability of novel problems and is not dependent on language proficiency or prior school learning, whereas crystallized intelligence is based on acquired knowledge (De Beer, 2005). Imported intelligence tests that only contain non-verbal subtests, have been administered to various South African school learner subgroups, in the hope to eliminate language and cultural bias; although excluding many potential bias challenges, non-verbal tests still use language and illustrations that could have cultural elements that may result in certain test items to be bias and inapplicable to the school learners tested (August, 2017; Ferrett, 2011; Jinabhai et al., 2004; Van Wyhe, 2012). Internationally developed intelligence instruments containing various indexes/scales such as the K-ABC-II and WISC-V, were developed on a theoretical base of cognitive process abilities including Spearman’s g-theory, the Cattell-Horn-Carroll theory and the PASS theory model (Cassoojee, 2020; Kaufman et al., 2016; Mitchell et al., 2018). Theory underlying intelligence instruments allows for insight into the different domains of cognition (Mitchell et al., 2018). A cognitive profile in

combination with results from linguistic and culturally fair intelligence instruments, should allow practitioners to make more accurate diagnoses and develop more suitable intervention strategies (such as school placements or special needs educational plans) for South African school learners (August, 2017; Ferrett, 2011; Jinabhai et al., 2004; Levert & Jansen, 2001; Reid et al., 2002; Shuttleworth-Edwards et al., 2013; Van Wyhe, 2012).

Viewing intelligence assessment within the unique, multidiverse ZA context is challenging, but also serves as an opportunity to advance intelligence instruments and their application in practice not only in ZA, but also globally. When used correctly the intelligence assessment is an efficient tool, yet it can be destructive when abused. Besides ensuring that the instrument itself is valid, reliable and optimally designed, the application and use of the instrument should be considered equally important. It is suggested that a thorough and user-friendly manual accompany the intelligence instrument at all times. The manual should cover topics including the specific purpose of the instrument, implied risks and safety measures, client and context limitations, as well as scope of the instrument. Detailed examples of case studies should outline the correct assessment procedure and possible pitfalls. Proper procedure is built on the four pillars of assessment as suggested by Sattler (2001) to triangulate findings. Official training of test users (and timely refresher courses) remains a key requirement to administer the instrument responsibly and optimally.

Limitations and Recommendations

While a critical review does serve to cluster the literature on a topic, the interpretative elements are necessarily subjective and the resulting product is the starting point for further evaluation, not an endpoint in itself (Grant & Booth, 2009). It is recommended that the findings of this research study (a critical review) should be considered in the possible development of a strategic guideline to design an intelligence instrument applicable to South African school learners.

Conclusion

Increased research has been undertaken in the psychometric field on local and national normative studies regarding various assessment measures in ZA (August, 2017). However, contextual factors could influence the applicability of the test instrument, as well as the school learners' test-taking skills/familiarity and prior learning (crystalized intelligence), and/or the school learners' cognitive abilities (fluid intelligence and other constructs of intelligence). Practitioners will need to consider this when developing or selecting intelligence test instruments to administer to specific South African school learner subgroups, as well as when interpreting test results for diagnosis and intervention purposes. As previously mentioned, a thorough history and insight of the school learners' ethnic, quality of school, and SES background in combination with a cognitive profile drawn from developmental, linguistic, and culturally fair intelligence instruments, should allow practitioners to make more accurate diagnoses and develop more suitable intervention strategies for South African school learners.

References

- August, J. O. (2017). *A normative study of the Raven's Coloured Progressive Matrices for South African children with cognitive barriers to learning* [Doctoral dissertation, Nelson Mandela Metropolitan University].
<https://core.ac.uk/download/pdf/160603144.pdf>
- Blake, B. M. (2011). *A Rasch Model Analysis of the Items on the VIQ8 Scale of a Sesotho Translated Version of the JSAIS* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28376972).
- Brown, L. V. (1998). *Pattern analysis of WISC-III profiles for African-American children* [Doctoral dissertation, Saint Louis University]. (Dissertation Abstracts International: Section B: The Sciences & Engineering, 59[1-B]). Available from ProQuest Dissertations and Theses database. (ProQuest document ID 9822855).
- Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, 26(2), 120–123.
<https://uwe-repository.worktribe.com/output/937596>
- Clarke, V., & Braun, B. (2018). Using thematic analysis in counselling and psychotherapy research: A critical reflection. *Counselling and Psychotherapy Research*, 18(2), 107-110. <https://doi.org/10.1002/capr.12165>
- Cassoojee, Z. (2020). *Comparative analysis of test performance of South African learners on indexes/scales of the Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V) and the Kaufman Assessment Battery for Children, Second Edition (KABC-II)*. [Master's dissertation, University of the Witwatersrand].
<https://wiredspace.wits.ac.za/server/api/core/bitstreams/261c5b4e-295d-4be9-b759-26f2dae0a71b/content>

- De Beer, M. (2005). Development of the Learning Potential Computerised Adaptive Test (LPCAT). *South African Journal of Psychology*, 35(4), 717–747.
<https://doi.org/10.1177/008124630503500407>
- De Klerk, W., & Pretorius, J. (2019). Guideline for conducting critical reviews in psychology research. *Journal of Psychology in Africa*, 29(6), 645-649.
<https://doi.org/10.1080/14330237.2019.1691793>
- Department of Labour (DoL, South Africa). (1998, October 19). Employment Equity Act, 1998 (Act no. 55 of 1998): Psychological testing and other similar assessments (Notice 1323). *Government Gazette*, 19370, p. 16.
https://www.gov.za/sites/default/files/gcis_document/201409/a55-98ocr.pdf
- Ferrett, H. L. (2011). *The adaptation and norming of selected psychometric tests for 12-to 15-year-old urbanized Western Cape adolescents* [Doctoral dissertation, Stellenbosch University]. <http://scholar.sun.ac.za>
- Foxcroft, C. D. (2011). Ethical issues related to psychological testing in Africa: What I have learned (so far). *Online Readings in Psychology and Culture*, 2(2), 1–19.
<https://doi.org/10.9707/2307-0919.1022>
- Foxcroft, C. D., Paterson, H., Le Roux, N., & Herbst, D. (2004). *Psychological assessment in South Africa: A needs analysis. The test use patterns and needs of psychological assessment practitioners: Final report. July*. Human Sciences Resource Council.
https://repository.hsrb.ac.za/bitstream/handle/20.500.11910/7498/1716_Foxcroft_Psychologicalassessmentin%20SA.pdf?sequence=1
- Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal* 26(2), 91–108.
<https://doi.org/10.1111/j.1471-1842.2009.00848.x>

- Jansen, P., & Greenop, K. (2008). Factor analyses of the Kaufman Assessment Battery for Children assessed longitudinally at 5 and 10 years. *South African Journal of Psychology*, 38(2), 355–365. <https://hdl.handle.net/10520/EJC98487>
- Jinabhai, C. C., Taylor, M., Rangongo, M. F., Mkhize, N. J., Anderson, S., Pillay, B. J., & Sullivan, K. R. (2004). Investigating the mental abilities of rural Zulu primary school children in South Africa. *Ethnicity and Health*, 9(1), 17–36. <https://doi.org/10.1080/13557850410001673978>
- Kaufman, A. S., & Kaufman, N. L. (2004). *Kaufman Assessment Battery for Children, second edition (KABC-II)*. American Guidance Service.
- Knoetze, J., Bass, N., & Steele, G. (2005). The Raven’s Coloured Progressive Matrices: Pilot norms for isiXhosa-speaking primary school learners in peri-urban Eastern Cape. *South African Journal of Psychology* 35(2), 175-194. <https://hdl.handle.net/10520/EJC98326>
- Laher, S. (2019). Psychological assessment in Africa: The time is now! [Editorial]. *African Journal of Psychological Assessment* 1(1), 1-3. <https://doi.org/10.4102/ajopa.v1i0.11>
- Laher, S., & Cockcroft, K. (Eds.). (2013). *Psychological assessment in South Africa: Research and applications*. Wits University Press. <https://doi.org/10.18772/22013015782.6>
- Laher, S., & Cockcroft, K. (2014). Psychological assessment in post-apartheid South Africa: The way forward. *South African Journal of Psychology*, 44(3), 303–314. <https://doi.org/10.1177/0081246314533634>
- Laher, S., & Cockcroft, K. (2017). Moving from culturally biased to culturally responsive assessment practices in low-resource, multicultural settings. *Professional Psychology: Research and Practice*, 48(2), 115–121. <https://doi.org/10.1037/pro0000102>

- Levert, T., & Jansen, P. (2001). A Lurian-Piagetian approach to assessment of historically disadvantaged Black scholars in English medium schools. *South African Journal of Psychology*, 31(4), 21–31. <https://hdl.handle.net/10520/EJC98142>
- Linstrom, A., Raven, J., & Raven, J. (2008). The Coloured Progressive Matrices in South Africa. In J. Raven & J. Raven (Eds.), *Uses and abuses of intelligence: Studies advancing Spearman and Raven's quest for non-arbitrary metrics* (1st ed., pp. 363–370). Royal Fireworks Press.
<http://www.eyeonociety.co.uk/resources/UAChapter14.pdf>
- Lucas, M. (2013). Neuropsychological assessment in South Africa. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 0–28). Wits University Press.
<https://doi.org/10.18772/22013015782.6>
- Madge, E. M. (1981). *The Junior South African Individual Scales (JSAIS)*. Human Sciences Research Council.
- Mawila, D. (2012). *An explorative investigation of the quality of items of the performance scales on the translated Sesotho version of the Junior South African Individual Scales JSAIS (GIQ-8)* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28377534).
- Meiring, D. (2007). *Bias and equivalence of psychological measures in South Africa*. Labyrinth. <https://pure.uvt.nl/ws/portalfiles/portal/819923/202038.pdf>
- Mitchell, J. M., Tomlinson, M., Bland, R. M., Houle, B., Stein, A., & Rochat, T. J. (2018). Confirmatory factor analysis of the Kaufman assessment battery in a sample of primary school-aged children in rural South Africa. *South African Journal of Psychology*, 48(4), 434–452. <https://doi.org/10.1177/0081246317741822>

- Moloi, S. E. (2014). *Investigation of improving the quality of sub-test items on the IsiZulu Translated Version of the Junior South African Intelligence Scale (JSAIS) GIQ8* [Master's dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28330162).
- Naglieri, J. A., & Das, J. P. (1997). *Cognitive Assessment System*. Riverside Publishing.
- Naicker, A. (2013). *An investigation of the quality of the test items on the Numerical scales of the isiZulu translated version of the Junior South African Intelligence Scales (JSAIS) (G-IQ8)* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28376976).
- Raven, J. C., Court, J. H., & Raven, J. (1990). *Manual for Raven's progressive matrices and vocabulary scales: American and international norms*. Oxford Psychological Press.
- Reid, K. D., Kok, J. C., & Van Der Merwe, M. P. (2002). The PASS model for the assessment of cognitive functioning in South African schools: A first probe. *South African Journal of Education*, 22(3), 246–252.
<https://www.ajol.info/index.php/saje/article/view/24877>
- Sattler, J. M. (2001). *Assessment of children: Cognitive applications* (4th ed.). Jerome M. Sattler Publisher.
- Shuttleworth-Edwards, A. B. (2016). Generally representative is representative of none: Commentary on the pitfalls of IQ test standardization in multicultural settings. *Clinical Neuropsychologist*, 30(7), 975–998.
<https://doi.org/10.1080/13854046.2016.1204011>
- Shuttleworth-Edwards, A. B., Kemp, R. D., Rust, A. L., Muirhead, J. G. L., Hartman, N. L., & Radloff, S. E. (2004). Cross-cultural effects on IQ test performance: A review and preliminary normative indications on WAIS-III test performance. *Journal of Clinical*

and *Experimental Neuropsychology*, 26(7), 903–920.

<https://doi.org/10.1080/13803390490510824>

Shuttleworth-Edwards, A. B., Van der Merwe, A. S., Van Tonder, P., & Radloff, S. E.

(2013). WISC-IV test performance in the South African context: A collation of cross-cultural norms. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 33–47). Wits University Press.

<https://doi.org/10.18772/22013015782.8>

Shuttleworth-Jordan, A. B. (1996). On not reinventing the wheel: A clinical perspective on culturally relevant test usage in South Africa. *South African Journal of Psychology*,

26(2), 96–102. <https://doi.org/10.1177/008124639602600205>

Teixeira, L. C. (2011). *A Rasch Model Analysis of Responses of isiZulu-speaking grade one learners to items on the Verbal Intelligence Quotient Eight (VIQ 8) Scale of an isiZulu translation of the Junior South African Individual Scales (JSAIS)* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28325704).

Van Eeden, R. (1991). *The Senior South African Individual Scales - Revised (SSAIS-R)*. Human Sciences Research Council.

Van Wyhe, K. (2012). *Wechsler Abbreviated Scale of Intelligence: Preliminary normative data for 12-15-year-old English- and Afrikaans-speaking Coloured learners in the Western Cape* [Master's dissertation, University of Cape Town].

<http://hdl.handle.net/11427/12057>

Visser, D., & Viviers, R. (2010). Construct equivalence of the OPQ32n for Black and White people in South Africa. *SA Journal of Industrial Psychology*, 36(1), 1-11.

<https://doi.org/10.4102/sajip.v36i1.748>

Wechsler, D. (2003). *Wechsler intelligence scale for children - fourth edition. (WISC-IV).*

The Psychological Corporation.

Zindi, F. (1994). Differences in psychometric performance. *The Psychologist: Bulletin of the British Psychological Society*, 7, 549–552.

Phase 2 (Document 2)

Exploring the experiences of intelligence test development/adaptation experts as well as psychologists and psychometrists who have administered intelligence instruments to South African school learners in various contexts

Author's Note

Manuscript submitted for possible publication.

Abstract

This qualitative research study emerged from the essential need for reliable and valid intelligence test instruments for South African school learners, who are characterised as a multidiverse population with their variety in culture, ethnicity, and language, as well as having unequal socio-economic and educational backgrounds. The aim of this research study was to use a qualitative interpretive description research design to investigate the experiences of both experts in intelligence test development/adaptation as well as psychologists and psychometrists who have administered intelligence tests to South African school learners in various contexts. Twelve psychologists/psychometrists were interviewed, of which six were also experts in test development/adaptation, which yielded four themes after thematic analysis, namely: utilised intelligence measurements in the current South African school learner context are not relevant anymore; the South African education system is a major issue specifically within lower socio-economic status contexts; newly or adapted intelligence measures cannot realistically be standardised in the current South African school learner context; and key informants' recommendations from their experiences. The findings of this research study can guide the strategic process to design an intelligence instrument suitable for a South African population of school learners.

Keywords: experiences, intelligence assessment, development, school learners, South Africa, qualitative.

Introduction

Influenced by the post-apartheid legislation promulgated in the Bill of Rights of South Africa (ZA) as part of the Constitution (South African Government, 1996), South African practitioners in the field of intelligence assessment practices on school learners and psychometric instrument development/adaptation experienced a major shift in consciousness, realising the need and obligation to administer, create, or adapt fair and unbiased assessment instruments in a multilingual and multi-ethnic society (Foxcroft et al., 2004; Laher & Cockcroft, 2014; Meiring, 2007). The South African school learner population is multidiverse, not only in culture, ethnicity, and language, but also due to past unequal socio-economic and educational opportunities (Laher & Cockcroft, 2017; Shuttleworth-Edwards, 2016; Van der Merwe et al., 2022). Despite almost three decades of restoration practices in the democratic ZA, vast discrepancies remain among the school learners (National Planning Commission [NPC], 2020; Ogbonnaya & Awuah, 2019; Van der Berg et al., 2020). There are sub-groups due to socio-economic variances, which caused the school learners to have unequal access to and levels of quality environments at home and school (Laher & Cockcroft, 2017; NPC, 2020; Ogbonnaya & Awuah, 2019; Van der Berg et al., 2020). Intellectually assessing multilingual and multi-ethnic local school learners from and within various environments poses challenges to both experts developing and/or adapting intelligence instruments and psychometrists and/or psychologists administering the instruments (Foxcroft, 2004; Laher & Cockcroft, 2017; Lucas, 2013; Van der Merwe et al., 2022).

The intelligence test instruments commonly administered in ZA are based on the psychometric model of testing, determining intelligence according to the individual's ability to perform test tasks and providing an indication of cognitive strengths and weaknesses (Cockcroft, 2013). To conduct such tests effectively as psychologists/psychometrists in a new inclusive framework, as promulgated by South African legislative policies, Swart and

Pettipher (2005) propose shifting the approach from a deficient-focused assessment (as prescribed by the medical deficit model) towards an asset-based, social systems change approach, where the school learner's personal strengths (intrinsic qualities) and assets (extrinsic resources in their social environment) are identified and utilised. The psychological assessment practice should be conducted in a dynamic and flexible manner, selecting "a battery of assessment measures and procedures applicable to the needs of the specific client and in response to the specific referral question" (Elkonin et al., 2004, p. 282). This, however, is not entirely possible if most assessment instruments available to these experts are inapplicable, outdated, or inaccessible (Lucas, 2013; Mitchell et al., 2018; Van der Merwe et al., 2022).

Present South African Psychological Intelligence Assessment Environment

In 2004, a decade after the commencement of the democratic ZA, the Human Sciences Research Council (HSRC) conducted a comprehensive survey into the test-use patterns and needs of psychological assessment practitioners in ZA (Foxcroft et al., 2004). Key findings included that many psychometric tests were outdated and not linguistically or cross-culturally relevant, consequently reducing their value, leading to an urgent plea for reliable revision and adjustments (Foxcroft et al., 2004).

South African psychologists and psychometrists presently have a limited selection of individual intelligence tests for assessing school learners (Mitchell et al., 2018; Van der Merwe et al., 2022). These instruments include norm-adapted, imported tests such as the Kaufman Assessment Batteries for Children-1st and 2nd edition (K-ABC; KABC-II; Kaufman & Kaufman, 1983, 2004), and the DAS-Naglieri Cognitive System (CAS; Naglieri & Das, 1997), the Senior South African Individual Scale–Revised (SSAIS-R; Van Eeden, 1991) and Junior South African Individual Scale (JSAIS; Madge, 1981), which are locally developed tests (Van der Merwe et al., 2022). Due to the scarcity of such locally developed instruments,

South African practitioners frequently rely on imported tests (Laher & Cockcroft, 2017; Shuttleworth-Edwards, 2016).

After 1994, a number of normative research projects were launched on differing population groups using various assessment instruments (August, 2017; Laher & Cockcroft, 2017; Laher et al., 2019). According to Van der Merwe et al. (2022), contextual and demographic factors, e.g. quality of schooling, language, and culture could affect the school learners' test performance and consequent intervention plans, questioning the suitability of the test instrument to all South African school learners.

Problem Statement

Despite new legislation, a “major shift in consciousness” by psychologists/psychometrists, and several normative research projects, the need to establish reliable and valid intelligence testing for South African school learners remains. South African school learners' diverse demographics and multiple educational and socio-economic contexts make the investigation more complex. This research study aimed to address this gap in this field by collecting data from the experiences of a group of professionals working within the multi-contextual domain of intellectual psychometric assessment of South African school learners.

Goal of the Research Study

This research study aimed to explore and describe the experiences of a group of experts in intelligence test development/adaptation and psychologists or psychometrists who have administered intellectual assessments to local school learners in various contexts. The following research question guided this research study: *What are the experiences of intelligence test developing and adaptation experts as well as psychologists and psychometrists who have administered intelligence assessment instruments to South African school learners in various contexts?*

Method of Investigation

Research Design

This research study used a qualitative interpretive description research design to meet the goal of the study. As a smaller, qualitative scale of investigation, the interpretive description design suited this study's research aim and question well, as it allowed for more in-depth findings and clinical understanding through capturing themes and patterns within subjective, yet reasoned and mindful interpretations (Thorne, 2016) of the experiences of experts, psychologists and psychometrists.

Participants and Research Context

Two types of population groups were included in the research study. The first consisted of professional experts with knowledge and experience in developing/adapting intelligence tests for reasons such as standardised norming, updating, or adjusting to fit a particular population criterion or need. They should have adapted/developed at least one intelligence test, as they needed to have experienced this process to provide any information regarding the research topic. Psychologists and psychometrists registered at the Health Professions Council of South Africa (HPCSA) and practising in the field of psychometric testing, were chosen as the second group type. They needed to have sufficient experience in intellectual assessments on school learners in various contexts in ZA. The final sample consisted of 12 psychologists/psychometrists, of which six were also experts in test development/adaptation. Participation in the study was voluntary and represented all nine provinces across ZA. The participants' experience in the field of psychology/psychometry varied (*see Tables 1 and 2*).

Table 1*Demographic Information of Participants*

Participant Number	Race	Gender	Field/Type of HPCSA Registration	Years of Practice as Registered Practitioner	Administered Intelligence Tests to ZA School Learners	Adapted and/or Developed Intelligence Test(s)
<i>P1</i>	Coloured	Male	Psychometrist	21-30 years	Yes	No
<i>P2</i>	Caucasian	Female	Psychometrist	6-10 years	Yes	No
<i>P3</i>	Indian	Female	Psychometrist & Research Psychologist	6-10 years	Yes	Adapted
<i>P4</i>	African	Female	Psychometrist	1-5 years	Yes	No
<i>P5</i>	African	Female	Educational Psychologist	11-20 years	Yes	Adapted
<i>P6</i>	Caucasian	Female	Research Psychologist	More than 30 years	Yes	Developed and Adapted
<i>P7</i>	Caucasian	Female	Educational Psychologist	21-30 years	Yes	No
<i>P8</i>	Caucasian	Female	Counselling- & Neuropsychologist	21-30 years	Yes	Adapted
<i>P9</i>	Caucasian	Female	Psychometrist & Research Psychologist	21-30 years	Yes	Developed and Adapted
<i>P10</i>	Caucasian	Female	Educational Psychologist	11-20 years	Yes	No
<i>P11</i>	Caucasian	Male	Clinical & Industrial Psychologist	More than 30 years	Yes	Developed and Adapted
<i>P12</i>	Caucasian	Female	Educational Psychologist	11-20 years	Yes	No

Table 2*Demographic Information of Learners Assessed*

Participant Numbers	Provinces Assessed									Learner Age/Phase School Level	Parental Education Level	Learner Race					Learner Socio-Economic Status			
	Gauteng	Mpumalanga	North-West	Limpopo	Free State	Northern Cape	Eastern Cape	Western Cape	KwaZulu-Natal			Coloured persons	African persons	Indian persons	Causation persons	Asian persons	Privileged socio-economic	Average socio-economic	Lower socio-economic	Very poor socio-economic
p1								x	x	x	x	x	x	x	x	x	x	x	X	x
p2							X		x	x	x	x	x	x	x			x	X	
p3	x							x					x	x					X	x
p4	x									x	x		x				x	x	X	
p5	x	x	x	x						x	x	x	x	x	x	x	x	x	X	x
p6	x				x	x	X	x	x		x	x	x	x	x	x	x	x	X	x
p7	x									x	x	x	x	x	x		x	x	X	x
p8								x		x	x	x	x		x		x	x	X	x
p9	x					x		x	x	x	x	x	x	x	x	x	x	x	X	x
p10	x									x	x		x	x	x		x	x	X	x
p11	x							x			x	x	x	x	x		x	x	X	x
p12					x					x	x	x	x	x	x	x	x	x	X	x

Data Collection

Data were collected through a demographic questionnaire and semi-structured interviews, using an internet-based communication platform.

Semi-structured interviews enabled the primary researcher to present herself in a formal, well-prepared manner, as well as leave room for probing and clarifying questions during the interviews. This led to flexible, interactive, and responsive conversations, allowing for qualitative, meaningful, and in-depth data (Williams, 2019). Questions were asked in the participants' preferred language (English or Afrikaans; *see Table 3 [English version only]*). Interviews were held until data saturation was reached.

Table 3*Questions asked during Semi-structured Interviews*

Questions asked to psychologists and psychometrists.	1. Do you believe the locally administered intelligence tests are applicable to South African school learners from different ethnic, socio-economic and/or academic backgrounds? Kindly motivate your answer. 2. When and for which purpose do you use intelligence tests? 3. Which intelligence test instruments do you use? What is your motivation for selecting this intelligence test instrument(s) above others available in South Africa? 4. Would you recommend any amendments or changes to be made to intelligence tests? If so, which amendments or changes would you recommend? If not, kindly motivate your answer. 5. In which way is the context in which you administer intellectual assessments unique from other contexts? 6. Were there elements in the assessed learners' contexts that seemed to have acted as barriers or challenges to their test performance? Kindly elaborate. 7. Do you think that the intelligence assessment instrument content considers the school learners' strengths internally and externally, or is it deficient-focussed? 8. How would you briefly describe your overall experience of administering intellectual assessments on school learners in this unique assessment context?
Questions asked to experts in intelligence test development and/or adaptation.	1. Do you think the administered intelligence tests are applicable to South African school learners from different ethnic, socio-economic and/or academic backgrounds? Kindly motivate your answer. 2. When and for which purpose did you develop/adapt an intelligence test(s)? 3. What were the most significant challenges during the development/adaptation of the intelligence test(s)? 4. What were the most significant insights gained during the development/adaptation of the intelligence test(s)? 5. How would you briefly describe your overall experience of developing/adapting intelligence tests for school learners?

Data Analysis

The interviews held were transcribed verbatim, from which themes were identified through reflexive thematic analysis (Braun & Clarke, 2021; Byrne, 2022), following procedures proposed by Clarke and Braun (2013): 1) familiarisation process by actively reading and re-reading through the data with interpretive reflection; 2) assigning code labels to text segments according to meaning and significance; 3) identifying themes from codes; 4)

reviewing themes against the research question; 5) defining and labelling themes; and 6) writing a final report.

Trustworthiness

Trustworthiness was upheld by following Guba's 1981 model of trustworthiness (Krefting, 1991) of credibility (accurate and truthful report of findings), transferability (clear, comprehensive descriptions), confirmability (applying structured methods for reliability), and dependability (keeping an audit trail, using co-coders, and taking guidance from reviewers).

Ethical Considerations

This research study received ethical approval from the North-West University's Health Research Ethics Committee (HREC) with reference number: NWU-00191-21-A1. Participants gave informed written consent before participation in the study. Participants were informed of anonymity and confidentiality measures to be followed and assured that their participation was voluntary.

Findings

Four main themes with sub-themes emerged from the analysed recorded data (see Table 4). To support the themes, applicable verbatim quotations are provided.

Table 4

Themes and Sub-themes

Theme 1:	Utilised intelligence measurements in the current South African school learner context are not relevant anymore
Sub-themes:	1.1 A lack of ongoing research 1.2 Due to multilingual and multicultural contexts 1.3 Outdated items
Theme 2:	The South African education system is a major issue specifically within lower socio-economic status contexts
Sub-themes:	2.1 Schools within lower socio-economic status contexts provide substandard education for school learners to enable them to appropriately answer intelligence measurements in South Africa 2.2 Should therefore be careful how we interpret results of current intelligence measures

Theme 3:	Newly or adapted intelligence measures cannot realistically be standardised in the current South African school learner context
Theme 4:	Key informants' recommendations from their experiences
Sub-themes:	4.1 Need to develop our own South African framework 4.2 We need input from all different groups represented in South Africa to really understand uniquely how we can define and conceptualise intelligence 4.3 Need to base use of type of intelligence measurement on context or functioning of the school learner 4.4 Update to reflect modern context 4.5 Correct norming needed 4.6 Need to establish optimal contexts and practices during preparation, assessment, and reporting processes

Theme 1: Utilised Intelligence Measurements in the Current South African School

Learner Context are Not Relevant Anymore

From the collected data, it emerged that the intelligence measurements being administered to South African school learners have become outdated and inapplicable when considering their present, modern, multicultural, and multilingual contexts. Absence of continuous research seemed to be an important explanation.

A Lack of Ongoing Research

Participants commented on the utilised intelligence instruments being outdated and inapplicable in the school learners' present contexts, since ongoing research did not occur. Participant 5 stated: "[...] the context of testing was different then. The assessment tools are not adapted to the times that we are in" (P5). Participant 11 referred to the limitations found when conducting research: "[...] research is limited [...] we don't have that access any more ... the HSRC simply told the schools: 'We are coming to you'. Not anymore. We are very reliant on opportunity samples" (P11).

Also referring to research limitations, specifically research capacity, Participant 7 argued the lack of noval tests stemming from universities functioning as segregated entities: "[...] problems stem from our history [...] if everyone had stood together, we could have already developed test batteries that hold benefit to our country and community [...]" (P7).

Participant 9 noted: “That is where our tests are behind, we do not really have the capacity to do that type of theoretical research to keep ahead and adjust our tests accordingly [...] our tests [have] become outdated [...]” but added that this does not necessarily make the test invalid: “[...] something like the SSAIS is criticised, it doesn’t have the latest Carroll Horn theory [...] the test becomes more sophisticated, but it doesn’t make that which the SSAIS measures invalid [...] That basic information did not disappear” (P9).

Hence, it appears that intelligence measurements administered to South African school learners have become irrelevant, but not invalid, when considering the learners’ current contexts, because continuous research did not happen.

Due to Multilingual and Multicultural Contexts

Many participants ascribed the irrelevance of utilised intelligence instruments to the multilingual and multicultural formation of local school learner groups. Participant 6, responding to whether locally administered tests are applicable to local school learners: “Generally, no, and that is the dilemma that we have [...] because of our multilingual, multicultural composition of our learners [...] impossibility of creating tests that are fair to everybody” (P6). She also stated how language could act as a barrier if the test is not administered in the school learner’s first language: “[...] the language of test administration, if it's not the first language of the learner, obviously, that's a barrier” (P6). Some participants stated how tests cannot be translated into the eleven official South African languages because of various existing dialects and obstacles with translations and back-translations. Other participants described how certain concepts of the same language differ, depending on the area in which that language is spoken.

Participant 7 stated how test items do not reflect the local population group or context: “[...] it does not reflect their world [...] instruments that come from overseas would address the population group in the context where it was created and not the South African context

[...]” (P7). Having school learners from diverse contextual backgrounds, Participant 6 noted the inapplicability of timed test items on South Africans, with elements such as a cultural sense of urgency, which affects how these tasks are undertaken: “[...] many external factors [...] affect the time and the reaction [...] that kind of research has no place in South Africa. It totally misses the point of having diversity of backgrounds, [...] languages, the understanding, the cultural sense of urgency [...]” (P6). Some participants noted that the role of ethnicity differences between assessor and assessee could also influence assessments.

It would appear that the utilised intelligence instruments are inapplicable to local school learners because of their multilingual and multicultural contexts.

Outdated Items

Participants mentioned that items in intelligence instruments, including language and graphics, were outdated and thus irrelevant to the school learner’s modern world. Participants 8 and 12 explained that certain items in the SSAIS-R and JSAIS are outdated, making them unsuitable to the modern culture: “[...] were firstly developed a long time ago [...] a lot of the items are outdated [...] some are not suitable because it's not part of our modern culture” (P8); and: “[...] not relevant anymore [...] the pictures and vocabulary [...] relevancy is questionable. It’s old-school” (P12). Participant 5 mentioned how the change of context over time has caused incomprehensiveness of test questions : “[...] item questions, some of them need a lot of explanation for the child to understand [...] as the context has changed” (P5). Outdated language in intelligence measurements was also mentioned, referring specifically to the translated test instruments: “Your Zulu, your Setswana, your Sepedi [...] the words in those tests are outdated [...]” (P4). Participant 7 also noted outdated vocabulary use and test items, arguing that if children were unable to answer these questions, it would not necessarily indicate lower cognitive functioning.

Thus, items found in intelligence tests are outdated, making them irrelevant to administer to local school learners in their modern contexts. Apart from this, the country's education system acts as major contributor to the issues found in intelligence testing.

Theme 2: South African Education System is a Major Issue Specifically within Lower Socio-Economic Status Contexts

Lower quality of education provided by schools located in the lower socio-economic status areas has been indicated to contribute to the issue of intelligence instrument inapplicability.

Schools within Lower Socio-Economic Status Contexts Provide Substandard Education for School Learners to Enable Them to Appropriately Answer Intelligence Measurements in South Africa

Schools located in lower socio-economic environments were reported to provide lower quality education, hindering these school learners to perform adequately on intelligence tests. Participant 12 mentioned: “[...] we see that they often function on a low level [...] scholastically they show much more handicaps than our kids who might come from another socio-economic group” (P12). Participant 8 noticed the poor quality of schooling offered by schools in disadvantaged areas: “[...] about 90% of them come from a more disadvantaged socio-economic background [...] often with very poor quality of schooling [...] either in a township or rural area” and, “[...] what I mean by disadvantaged is that the school itself is not well resourced” (P8). Providing examples: “[...] they don't have libraries or computer rooms, often toilets aren't working properly. Teachers are often not trained all that well and not all that motivated to teach, classes are overfull ...” (P8). Other challenges: “[...] often children walk very far to school and it's dangerous, so they're not always motivated to attend school every day [...]” also, “[...] parents are often not well educated themselves, so can't help them with their schooling, don't really see the need for schooling [...]” and, “[...] not

really all that involved in their [children's] lives [...] a lot of drug abuse, alcohol abuse [...]" (P8).

In view of the hindering influence of substandard education on school learner intellectual test performance, participants commented on how results from these measurements need to be carefully considered.

Should therefore be Careful how We Interpret Results of Current Intelligence Measures

Considering fair assessment practice and school learners' educational backgrounds, Participant 6 mentioned how school learners' scores on intelligence tests need to be interpreted cautiously: "We must be very careful how we interpret results, unless we can really motivate that it is a fair way of assessing [...] and if you look at the educational component [...]" (P6).

Participant 5 cautioned that school learners from rural backgrounds may perform below their potential when answering test questions due to limited exposure to the testing language of English: "[...] with your rural and shy learner that does not necessarily mean that they don't know when they say they don't know, so you probe a bit more [...]" because, "[...] a child who's not exposed to speaking in English all the way [speaking English sufficiently], will answer yes or no when it's not necessarily the correct answer" (P5).

Because of differing information exposure provided in various environments as well as the verbal element found in intelligence tests, Participant 7 claimed that one cannot infer lower cognitive functioning from underperformance in tests: "[...] there're some of the words in the Vocabulary subtest which children are not exposed to. So if they cannot answer it, it is not necessarily an indication of lower cognitive functioning, it's [rather] an indication of not being part of their world of living" (P7).

Therefore, substandard education provided by schools within lower socio-economic status contexts acts as a major contributor to the school learners' inadequate performance on

intelligence tests, which necessitates the careful interpretation of these school learners' performance results. Considering the present school environments, it seems unfeasible to standardise new or adapted intelligence test measurements.

Theme 3: Newly or Adapted Intelligence Measures Cannot Realistically be Standardised in the Current South African School Learner Context

During data gathering, it became evident that intelligence tests cannot really be standardised as a fair measure that will accommodate every school learner in the various South African contexts. This perception was supported by Participant 6: "It becomes impossible to realistically create a test that will work for everybody [...] a fair way of assessing what you then call intelligence" (P6). Raising an important question regarding norm collection of multilingual groups: "[...] you run into translation difficulties and regional dialects [...] can you [therefore] focus only on those who have larger than 8% representativity? And can you stick to English only, or can you stick to non-verbal items only?" (P6). Calling it an "almost unsolvable problem", Participant 9 stated: "norms, this almost unsolvable problem with our heterogeneous population and factors that have the influence on performance [...]" and: "[...] aging of norms [...] the Flynn-effect says the test should become too easy [...] but you cannot just say in twenty years, people become more clever, people [sometimes] become dumber" (P9). She elaborated: "I could use a comparative norm group, but then it would mean that there where I measure poorly, do I then measure equally poorly with all of them?" (P9). Providing an example, "[...] a sensible score, let's say hundred [...] it doesn't mean a hundred. I have [merely] measured equally poorly with everyone" because, "[...] if I compare that child with a group where I do measure correctly, then that child falls out. Not because he isn't hundred, but the external factors play too big of a role" (P9).

Tapping into the shared experience of being part of adaptation projects: “[...] my difficulty wasn’t so much the test adaptation [...] my colleagues did it amazingly quickly and well. The challenge was to get that back-translated, back to English” (P8). Concurring with these difficulties: “[...] the test that I adapted was more for language use and conceptualisation [...] significant challenges [...] [were] staying with the sense of what the question is asking [keeping to the aim of the question] while contextualising it [...]” because, “[...] a language has different language rules. When you now translate it back, the sense [test meaning and intent] is different ” (P5). Participant 8 mentioned how various dialects complicate translation work: “[...] you can’t get away from the fact that, no matter what words you use, if the child speaks a different dialect of that language, there might be words that they don’t understand” (P8).

Participant 9 informed that merely changing test items into African-centred test items does not necessarily change the underlying theoretical construct: “I have attended workshops and congresses where they were going to give me an African-centred test [...] I go in very excited and I leave very disappointed [...]” because, “... there are [participant with hands in her hair] ethnic tests that they say are new, but it is merely the Wechsler-model. There’s nothing new theoretically, there’s nothing new” (P9). She elaborated that novel and suitable test items merely serve as plasters and do not address the challenge of demographic influences on test performance: “[...] it simply remains the basic thing [basically the same]. ‘Instead of two-dimensional, let us use three-dimensional [...] and feathers and beads, because it’s more familiar [...] or Pattern Completion, but with Venda patterns”, so, “It’s all improvements, but it does not address our basic problem of cross-cultural [...] the influence of demographic factors” (P9).

To develop and adapt fair and applicable intelligence measurements to multilingual and multicultural school learners within diverse contexts, tests need to be standardised.

Participants noted several challenges during this standardisation process: “[...] if you calculate norms, you would need a great amount of subgroups, especially in our country [...] [with] such a heterogenic group, you’re sitting with an extremely large test sample [...] Who’s going to test these masses of children?” (P9); “[...] in terms of sample sizes, language, and the use of translations [...] that’s a big hurdle [...] you want to be representative and have people from all language and culture groups [...]” (P6); “[...] several colleagues, willing and able to collect norms, taking their own time [...] but we still couldn’t get nearly enough [...] we use those norms now as a guideline [...]” (P8); “[...] it would be better if we had much larger sample sizes. We had to limit the ages that we could reach because of limited resources” (P8); “[...] this type of research isn’t cheap [...] there aren’t a lot of practitioners in our regions outside of Western Cape, KwaZulu-Natal, and Gauteng [...]” (P3); and: “[...] to really pull representative test samples and get access to it [...] to get thousands of profiles means a thousand tests that need to be administered for an hour and a half long individually” (P11). Some participants noted the loss of the government-supported HSRC not performing the role of psychometric test development research anymore and questioned the possibility of really being able to collect representative samples.

The above-mentioned challenges prove that intelligence measurements cannot really be developed or adapted to suit the school learners from diverse areas and educational backgrounds in ZA. In the next theme, key participants have provided some helpful suggestions of how one could go about still attempting this seemingly impossible task.

Theme 4: Key Informants’ Recommendations from Their Experiences

Derived from their experiences of developing, adapting and/or administering intelligence test batteries to school learners in various regions of ZA, key participants have shared significant ideas of how to approach the challenging task of attempting to develop and/or adapt intelligence measurements that are fair and applicable.

Need to Develop Our Own South African Framework

Key participants mentioned the need to create a theoretical framework for intelligence testing that is authentic to ZA, upon which fair and applicable intelligence measurements can be built. Calling it “a unique construct”, Participant 6 encouraged designing an original, personalised framework: “[...] a unique construct for South Africa [...] for cognitive assessment is needed. Where we don't start with an existing model or understanding of intelligence [...] or how it can be measured” (P6).

Participant 8 suggested: “First ask yourself what you mean by intelligence [...] [what do] IQ-tests measure [...] there's *[sic]* so many different theories about what IQ is [...]”; however, “[...] you can't only measure a few cognitive functions and generalise that to [the functioning of] the whole child [...] one's got to go back to roots of ‘what are you really trying to measure?’” (P8).

Participant 6 explained that it is difficult for South African stakeholders to develop renewed and personalised psychological constructs, because of their inability to move forward from past negative experiences: “[...] an international psychology conference linked to the Cross-Cultural Conference [...] there was a new body called ‘Forum for African Psychology’ [...] I attended to be part of renewal and thinking differently ... “ (P6). She continued: “[...] my experience was disappointing [...] there was a lot of criticism against what was before and I quite accept that many things were not done with everybody in mind ...” however, “[...] it's easy to say what we never want to see again, but it is not so easy to say: ‘Well, then what should we do?’” (P6). Despite this, participants still pursued the idea of creating a unique framework, suggesting the representative input of various groups in ZA.

We need Input from all Different Groups Represented in South Africa to Really Understand Uniquely How We Can Define and Conceptualise Intelligence

Stating this sub-theme clearly, Participant 6 suggested: “[...] we need to involve people of all cultural and language groups in this journey [...] We need input from all different groups represented in South Africa [...]” (P6). Elaborating her point: “[...] to really understand uniquely how we can define and conceptualise intelligence [...] [that is] unique for South Africa, related to the concept of Ubuntu [...] linked to their cultural way of being [...]” (P6). Providing practical examples: “We need to go back to the clean slate drawing board and find out how is intelligence experienced, seen, defined, observed, in a multicultural South African context [...]” and “[...] from there, try to operationalise this into something measurable and valuable [...] in a way that everybody can agree is representative of what is considered intelligent behaviour, or intelligent reasoning” (P6).

With tolerance and acceptance, over time, intelligence could be uniquely defined and conceptualised through the multidimensional viewpoints of various South Africans joining forces.

Need to Base Use of Type of Intelligence Measurement on Context or Functioning of the School Learner

Key informants recommended selecting administered intelligence tests according to the school learner’s environment or behaviour. Participant 3 expressed this well by stating that, “[...] the context in which you’re working, or client with whom you’re working dictates what assessment you can use” (P3), suggesting that the learners’ background (demographics, context, and type of school) needs consideration during instrument selection: “[...] language combined with the age and the type of schooling [...] a school in a rural area, township or suburb. So that kind of exposure will decide which tests I will use for which learner” (P5), and “[...] use another instrument which is perhaps friendlier [...] the things which could

bring challenges — field of experience, terms, language, and culture” (P1). Participant 3 explained that the assessment aim determines the test being selected: “[...] there’s a range of intelligence assessments [...] [which] measure different things [...] sometimes just a person’s GMA and other times a far more comprehensive, complex understanding of their reasoning [ability] [...]” therefore, “[...] all of that comes into play in how we select our tools” (P3). She noted, however, how practitioners are limited by only being allowed to administer tests recognised by the HPCSA: “Selecting the tools that I use need to be on the HPCSA list [...]” however, “[...] sometimes we have assessments [...] with [adequate] sample size, reliability, validity, non-bias [...] differential item functioning and all of those fun things, but it’s not on the HPCSA list, so I can’t use it.” (P3).

Reflecting on the above-mentioned statements, it became clear that school learners’ contexts and functioning need to be considered when selecting intelligence instruments for fair assessment. As these learners reside in modern contexts, intelligence instruments should also replicate this essential feature.

Update to Reflect Modern Context

To represent the modern elements of South African school learners’ contexts, intelligence tests need to be updated. Participant 1 explained that modernising intelligence instruments “scientifically and statistically” should make them applicable again: “[...] adaptations and renewal [...] [to] be applicable again [...] a new instrument that is scientifically and statistically up to standard” (P1). The following participants described how updated versions need to reflect the school learners’ modern contexts: “[...] questions could be revised and be made more context-applicable [...] more in trend with the child’s life today” (P10); and: “[...] the context is very different now [...] questions really need to be revised [...] contextualised and generalised for all the settings within the country” (P5). Adaptation suggestions: “[...] make it more interesting, more creative [...] those pictures and

illustrations are really quite old-fashioned and come from ‘long-gone’” (P10); “[...] scenarios [...] [should] not be specific for a certain setting only [...] [as] a child that is not exposed to certain settings [...]” for instance, “[...] an outdated question about a postage and a stamp [...] today’s child don’t *[sic]* relate to that. I would rather they be generalised for situations [which] children are now exposed [to]” (P5). Participant 2 mentioned updating norms, among other updates: “[...] a few updates [...] even on norms in South Africa, ‘cause [...] our culture and demographics have changed quite considerably” (P2).

Modernising intelligence instruments includes updating norms, which need to be done in the correct manner.

Correct Norming Needed

Sharing their experiences in developing, adapting, and/or administering intelligence tests, key informants recommended having adequate norming procedures in place that are designed to promote optimal representation of South African school learners. Participant 5 shared her insights gained during a project of test adaptation: “[...] the variety of people and the context [...] when you do the norms, you include almost everybody [...]” and the “[...] experience of adapting those tests helped me understand the deeper the importance of norms [...] it’s not something that we should take very lightly” (P5). Participants 9 and 8 highlighted capturing the heterogenic nature of the school learner group to match them demographically: “[...] you standardise to get appropriate norm groups [...] especially in our country where you have such a heterogenic group and would want a very heterogenic test sample” therefor, “[...] make provision for everything [...] various school types, various socio-economic groups, various language groups, various racial groups” (P9); and: “... [one] must have enough norms so the child can be matched properly demographically. So, you want to look at age, level of education, quality of education, fluency in a language [...]” (P8). Participant 9 explained how subgroup norming could be applied to heterogenic groups;

however, the context needs to have fewer variables: “If the population in terms of demographic factors, education, socio-economics, language, etc. is heterogenic [...] use subgroup norms, but it only works within very specific environments, the use of within-group norms” (P9).

Other than correct norming practices, key participants also recommended the creation of optimal contexts and practices during intelligence assessment.

Need to Establish Optimal Contexts and Practices during Preparation, Assessment, and Reporting Processes

Practitioners need to ensure favourable contexts and practices before, during, and after the assessment process. Participant 6 mentioned how practitioners should ensure a fair and appropriate assessment process: “[...] psychometrists and psychologists [...] must realise that they carry that responsibility [...] the total process [...] [should be] managed appropriately, fairly, and responsibly” (P6). A while before assessment (P6). Participant 6 further recommended laying the groundwork and getting to know the context first: “[...] if you are external to the assessment context, that homework of really understanding the context and getting people to explain it properly to you” (P6). She explained how this initial process would entail careful thought and discussions with related parties: “[...] that's the footwork [...] [which] requires discussions [...] taking time and making prior appointments long before the assessment day” (P6). If there is resistance, ideas need to be conceptualised that would ensure a fair assessment process: “[...] sometimes you get resistance when you communicate with people within a particular context [...] [simply] put your mind to things that will make it fair in terms of assessment” (P6).

Participant 9 told of power imbalances that occurred during the apartheid times, where children were merely “told” to be assessed, producing a lot of anxiety: “[...] in the lower socio-economic areas [...] it was long ago, so to me it was actually a very, very unfair

power relationship there. Those children were very anxious, very defenceless [...]” because, “[...] there was an extreme amount of test anxiety. And power imbalance – the school says: ‘You shall be tested now.’” (P9). Sadly, Participant 6 has witnessed the same power imbalances still occurring today: “Too many times, when you assess in different contexts, you become aware that the people don't know why they're there. They were told to be there [...]” (P6). This power play may cause anxiety and underperformance: “[...] power dynamics in your authoritative school environments [...] from the principal down, you are told: ‘We're doing assessments today.’” and “[...] there's not much time for a nice introductory chit-chat to put you at ease [...] that's where the anxiety creeps in and cognitive ability is affected [...]” (P6). To address the stigma that is formed from these unfair practices, Participants 6, 8, and 11 recommended taking time to explain to the school learners of the features and practices involved in the assessment process.

On the day of the assessment, some participants mentioned checking if the school learners have travelled far before assessment or had enough sleep and nutrition, and attempted to support where possible to provide them an opportunity for best performance. Other than basic needs, Participant 7 noted the importance of drawing attention to challenges found in school learners' contexts which could affect their performance: “I would ask a child: ‘How did you get to school?’” because, for instance, “If a child has driven with an over-anxious, activated, aggressive parent before the assessment, you will sit with a child experiencing anxiousness [...] those previous experiences should be taken into account” (P7).

Discussion

Steered by the research question, the study discovered four main themes (with sub-themes) from the semi-structured interviews with psychologists/psychometrists/experts who shared their experiences of developing/adapting or administering intelligence test instruments to local school learners from and within various contexts. Participants stated how intelligence

measuring instruments have become inapplicable; however, not invalid, when considering the learners' modern, multicultural, and multilingual contexts, because ongoing research has declined, especially after the HSRC had discontinued psychometric test development, and the test items (which include their illustrations and language use) have become outdated. Shortly after the political transition psychometric research and development by state-funded organisations (such as the HSRC) was halted temporarily. By the time new policies for fair testing were implemented (by the Employment Equity Act 55 of 1998), many experts had left the country and public sector, and such services were discontinued, causing a substantial decrease in psychometric test development and adaptation (Foxcroft et al., 2004; Tredoux, 2013). Presently, intelligence test instruments have become outdated, inapplicable, and unfair to administer to multicultural and multilingual school learners within various contexts (Laher et al., 2019; Shuttleworth-Edwards, 2023; Van der Merwe et al., 2022); however, these tests nevertheless are “more reliable and valid than any of the limited number of alternatives” (Laher & Cockcroft, 2013, p. 4). Mitchell et al. (2018) mention the shortage of available culturally appropriate cognitive tests for school learners.

Many participants indicated that the unsuitability of intelligence tests is owed to the substandard education provided, specifically by schools located within lower socio-economic status contexts, which affect the ability and performance of school learners from these schools. Careful interpretation of the school learners' test scores and performances was accordingly argued, acknowledging differing exposures to language and information. This agrees with Shuttleworth-Edwards et al. (2013), who stated how the quality of education received by local school learners is related to their performance on intelligence tests. Various South African normative studies posited that considerable differences in intelligence test scores of school learners were not primarily due to ethnic differences, but rather the differences in the quality of education (Amod, 2013; Greenop et al., 2013; Shuttleworth-

Edwards et al., 2013). Clearly, South African schools provide various levels in quality of education when comparing the five quintiles into which schools are categorised, according to their socio-economic status (Maistry & Africa, 2020; Ogbonnaya & Awuah, 2019) [see quintile and poverty distribution across provinces at DBE (2021)]. School learners who go to schools located in disadvantaged areas (quintiles one to three) tend to receive lower quality of education and yield lower academic performances than school learners who attend more privileged schools (quintiles four and five) (Graven, 2014; Ogbonnaya & Awuah, 2019; Spaul, 2012). Inequalities in education provided across various schools have been noted [see Spaul & Jansen (2019)]. Referring to the SACMEQ III dataset for South Africa, Spaul (2012) remarked that a school's socio-economic status had a far greater impact on school learner performance than individual learner's socio-economic background. In addition, Mitchell et al. (2018, p. 435) have drawn attention to how the locally developed intelligence test battery, namely the SSAIS-R, is "somewhat biased to educational exposure, in particular verbal and linguistic abilities", which further supports the argument for unfair, inapplicable intelligence measuring instruments where careful interpretation of intelligence measured results is needed, especially of school learners who attend schools within lower socio-economic contexts (Laher et al., 2019; Mitchell et al., 2018; Shuttleworth-Edwards, 2023).

As participants regarded the heterogenic nature of the local school learners with their differing contexts, it became evident that newly or adapted intelligence measures cannot realistically be standardised as fair and applicable measurements to all. Examples of challenges include translation difficulties (particularly with multiple South African languages with different vocabularies and language rules than English, and additionally the existence of various regional dialects); issues with test norming and standardisation practices within multi-ethnic population groups; as well as limited research opportunities due to a lack of resources and accessibility. Questions and concerns were raised around topics such as the

influence of demographics and the Flynn-effects during norm development practices, the possibility of conducting fair and appropriate comparative norming practices within multidimensional population groups, and the feasibility of developing novel, African-centred intelligence tests. Standardisation challenges and concerns were also raised by authors such as Aston (2006) and Truter et al. (2018), who have mentioned how the population-based projects of standardising the Wechsler's scales (third and fourth editions) towards the whole South African population group, have received criticism regarding the norming processes followed. Shuttleworth-Edwards (2016, 2017) states that practices of country-wide unitarity norming applied on intelligence tests, in countries with culturally heterogeneous contexts, are invalid, as ZA does not represent one unified population culture that could be generalised. Laher and Cockcroft (2014) mention some positive contributions that have been made in adapting and standardising psychological test instruments suitable for local contexts; however, highlighted the need for developing emic measurements that are appropriate for the local African population for whom Western-developed tests may be inapplicable.

Despite the former concerns and challenges regarding fair intelligence testing of local school learners, participants have shared and provided insightful suggestions of how one could undertake this seemingly unfeasible task. Recommendations included gathering input from various local groups to define and conceptualise the term 'intelligence', designing an original, personalized South African framework, aligning the intelligence measurement to the school learners' context and functioning, updating the intelligence instrument to reflect the learners' contexts, norming the intelligence tests adequately, as well as ensuring optimal contexts and practices while preparing, assessing and reporting intelligence measurements of local school learners. Various research studies have been conducted over the past two decades across ZA (Laher et al., 2019; Shuttleworth-Edwards, 2023). Good examples can be found in the editorial work by Laher and Cockcroft (2013) and in the book by Shuttleworth-

Edwards and Truter (2023). Although occurring in separate clusters, these studies have proved to change values in the field of psychological assessment with attempts of designing tests that are unbiased, applicable, and fair to the diverse South African population (Laher & Cockcroft, 2014).

Implications

From the shared experiences of the practitioners who participated in the research study, it became clear that the intelligence tests administered to South African school learners are unfair, inappropriate, and inapplicable, especially when considering school learners' demographics and the modern, multidimensional contexts at home and school. They stated how the development and adaptation of fair and suitable intelligence tests does not seem realistic or possible. Intelligence tests and instruments still function as essential means towards school learner guidance and support, where the combination of interpreted measured cognitive abilities (e.g. their strengths and challenges) and other findings (e.g. learner background information or observations from testing) aid the practitioner in developing applicable intervention strategies (Beal et al., 2019). Guided by the Constitution of South Africa (South African Government, 1996) and the ethical obligation of local practitioners, the need to have intelligence measurement instruments that will cater for all remains a pressing reality, calling for effective and emic research studies in the field of intelligence instruments (development, adaptation, and norming) and intelligence assessment (Laher & Cockcroft, 2017; Van der Merwe et al., 2022).

Limitations and Recommendations

The research study's findings were affected by some limitations. As common for qualitative studies, the sample size was relatively small to allow for more in-depth and mindful interpretations and findings, as suggested by Thorne (2016). Even though each province in ZA was represented, shared experiences from other practitioners would yield

more insight into the topic. A similar study with a larger sample of professionals in the field is recommended. A complementary study of gathering data from the experiences of school learners, parents and educators regarding intelligence testing could additionally yield valuable information.

Conclusion

Research findings provided significant evidence that intelligence measurement instruments administered to local school learners have been inapplicable and unfair, especially in the view of the multidimensionality of school learners' demographics, ethnicity, and contexts. Test performance of school learners in schools in lower socio-economic environments needs to be interpreted with caution, as those schools tend to offer substandard education, and intelligence test batteries such as the SSAIS-R are criticised of being biased to those with less educational exposure (Mitchell et al., 2018). Despite these challenges, it is imperative that all South African school learners be provided the opportunity to be intellectually assessed by suitable and ethically-fair test instruments, in order to reap the benefits and receive the opportunities which intellectual assessment can deliver. Such benefits include identification of learning challenges, giftedness, and other important information from which school placement, referrals, and learner support plans could be generated (Kranzler et al., 2020). Key informants provided recommendations from their experiences in intelligence testing and/or intellectual instrument adaptation/development, to approach the challenging task of developing, adapting, and administering intelligence measurements that are fair and applicable to all South African school learners.

References

- Amod, Z. (2013). The Das-Naglieri Cognitive Assessment System. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 104-119). Wits University Press.
<https://doi.org/10.18772/22013015782.6>
- Aston, S. (2006). *A qualitative bias review of the adaptation of the WAIS-III for English-speaking South Africans* [Master's dissertation, Nelson Mandela Metropolitan University]. <https://www.semanticscholar.org/paper/A-qualitative-bias-review-of-the-adaptation-of-the-Aston/1133eb8bba93ea459a086792ec31de4d3d91dc40>
- August, J. O. (2017). *A normative study of the Raven's Coloured Progressive Matrices for South African children with cognitive barriers to learning* [Doctoral dissertation, Nelson Mandela Metropolitan University].
<https://core.ac.uk/download/pdf/160603144.pdf>
- Beal, A. L., Holdnack, J. A., Saklofske, D. H., & Weiss, L. G. (2019). Practical considerations in WISC-V interpretation and intervention. In L. G. Weiss, D. H. Saklofske, J. A. Holdnack, & A. Prifitera, (Eds.), *WISC-V. Clinical use and interpretation* (2nd ed., pp. 23–53). Elsevier.
- Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, 18(3), 328-352.
<https://doi.org/10.1080/14780887.2020.1769238>
- Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality and Quantity*, 56(3), 1391–1412. <https://doi.org/10.1007/s11135-021-01182-y>

- Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, 26(2), 120–123.
<https://uwe-repository.worktribe.com/output/937596>
- Cockcroft, K. (2013). The Senior South African Individual Scales – Revised: A Review. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 48–59). Wits University Press.
<https://doi.org/10.18772/22013015782.6>
- Department of Basic Education (DBE; South Africa). (2021, March 10). South African Schools Act, 1996 (Act No. 84 of 1996): Amended National Norms and Standards for School Funding (Notice 669). *Government Gazette*, 44254, pp. 3-4.
<https://www.gpwonline.co.za/GPWGazettes.htm#>
- Elkonin, D., Foxcroft, C., Roodt, G., & Astbury, G. (2004). The use of assessment measures in various applied contexts. In C. Foxcroft & G. Roodt (Eds.), *An introduction to psychological assessment in the South African context* (1st ed., pp. 265–294). Oxford University Press.
- Foxcroft, C. (2004). Planning a psychological test in the multicultural South African context. *SA Journal of Industrial Psychology*, 30(4), 8–15.
<https://doi.org/10.4102/sajip.v30i4.171>
- Foxcroft, C., Paterson, H., Le Roux, N., & Herbst, D. (2004). *Psychological assessment in South Africa: A needs analysis. The test use patterns and needs of psychological assessment practitioners: Final report. July*. Human Sciences Resource Council.
https://repository.hsrb.ac.za/bitstream/handle/20.500.11910/7498/1716_Foxcroft_Psychologicalassessmentin%20SA.pdf?sequence=1

- Graven, M. H. (2014). Poverty, inequality and mathematics performance: The case of South Africa's post-apartheid context. *ZDM - Mathematics Education*, 46(7), 1039–1049.
<https://doi.org/10.1007/s11858-013-0566-7>
- Greenop, K., Rice, J., & De Sousa, D. (2013). The Kaufman Assessment Battery in South Africa. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 86–103). Wits University Press.
<https://doi.org/10.18772/22013015782.6>
- Kaufman, A. S., & Kaufman, N. L. (1983). *Kaufman Assessment Battery for Children (K-ABC)*. American Guidance Service.
- Kaufman, A. S., & Kaufman, N. L. (2004). *Kaufman Assessment Battery for Children, second edition (KABC-II)*. American Guidance Service.
- Kranzler, J. H., Maki, K. E., Benson, N. F., Eckert, T. L., Floyd, R. G., & Fefer, S. A. (2020). How do school psychologists interpret intelligence tests for the identification of specific learning disabilities? *Contemporary School Psychology*, 24(4), 445–456.
<https://doi.org/10.1007/s40688-020-00274-0>
- Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *The American Journal of Occupational Therapy*, 45(3), 214–222.
<https://doi.org/10.5014/ajot.45.3.214>
- Lahar, S., & Cockcroft, K. (Eds.). (2013). *Psychological Assessment in South Africa: Research and applications* (1st ed.). Wits University Press.
<https://doi.org/10.18772/22013015782.6>
- Laher, S., & Cockcroft, K. (2014). Psychological assessment in post-apartheid South Africa: The way forward. *South African Journal of Psychology*, 44(3), 303–314.
<https://doi.org/10.1177/0081246314533634>

- Laher, S., & Cockcroft, K. (2017). Moving from culturally biased to culturally responsive assessment practices in low-resource, multicultural settings. *Professional Psychology: Research and Practice*, 48(2), 115–121. <https://doi.org/10.1037/pro0000102>
- Laher, S., Fynn, A., & Kramer, S (Eds.). (2019). *Transforming research methods in the social sciences: Case studies from South Africa* (1st Ed.). Wits University Press.
<https://doi.org/10.18772/22019032750>
- Lainson, K., Braun, V., & Clarke, V. (2019). Being both narrative practitioner and academic researcher: A reflection on what thematic analysis has to offer narratively informed research. *International Journal of Narrative Therapy and Community Work*, (4), 86-98. <https://search.informit.org/doi/abs/10.3316/informit.846799716151082>
- Lucas, M. (2013). Neuropsychological assessment in South Africa. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 0–28). Wits University Press.
<https://doi.org/10.18772/22013015782.6>
- Madge, E. M. (1981). *The Junior South African Individual Scales (JSAIS)*. Human Sciences Research Council.
- Maistry, S. M., & Africa, I. E. (2020). Neoliberal stratification: The confounding effect of the school poverty quintile ranking system in South Africa. *South African Journal of Education*, 40(4), 1–9. <https://doi.org/10.15700/saje.v40n4a1872>
- Meiring, D. (2007). *Bias and equivalence of psychological measures in South Africa*. Labyrinth. <https://pure.uvt.nl/ws/portalfiles/portal/819923/202038.pdf>
- Mitchell, J. M., Tomlinson, M., Bland, R. M., Houle, B., & Stein, A. (2018). Confirmatory factor analysis of the Kaufman assessment battery in a sample of primary school-aged children in rural South Africa. *Psychological Society of South Africa*, 48(4), 434–452.
<https://doi.org/10.1177/0081246317741822>

- Naglieri, J. A., & Das, J. P. (1997). *Cognitive Assessment System*. Riverside Publishing.
- National Planning Commission. (2020). *Economic Progress towards the National Development Plan's Vision 2030: Recommendations for course correction*. Department of the Presidency RSA: NPC.
- www.nationalplanningcommission.org.za/publications_reports
- Ogbonnaya, U. I., & Awuah, F. K. (2019). Quintile ranking of schools in South Africa and learners' achievement in probability. *Statistics Education Research Journal*, 18(1), 106–119. <https://doi.org/10.52041/serj.v18i1.153>
- Shuttleworth-Edwards, A. B. (2016). Generally representative is representative of none: commentary on the pitfalls of IQ test standardization in multicultural settings. *Clinical Neuropsychologist*, 30(7), 975–998. <https://doi.org/10.1080/13854046.2016.1204011>
- Shuttleworth-Edwards, A. B. (2017). Countrywide norms declared obsolete: Best practice alert for IQ testing in a multicultural context. *South African Journal of Psychology*, 47(1), 3–6. <https://doi.org/10.1177/0081246316684465>
- Shuttleworth-Edwards, A. B. (2023). Cognitive test norms within multicultural, multiracial, multilingual, multi-opportunity South Africa: Clinical neuropsychological assessment and diagnosis. In G. J. Boyle, Y. Stern, D. J. Stein, B. J. Sahakia, C. J. Golden, T. M.-C. Lee, & S.-H. A. Chen (Eds.), *The SAGE Handbook of clinical neuropsychology: Clinical neuropsychology* (1st ed., pp. 94–107). SAGE.
- <https://doi.org/10.4135/9781529789539>
- Shuttleworth-Edwards, A. B., & Truter, S. (2023). *Cross-Cultural Cognitive Test Norms: An Advanced Collation from Africa*. Inter-Ed Publishers. <https://www.inter-ed.co.za/cross-cultural-cognitive-test-norms-an-advanced-collation-from-africa/>
- Shuttleworth-Edwards, A. B., Van der Merwe, A. S., Van Tonder, P., & Radloff, S. E. (2013). WISC-IV test performance in the South African context: A collation of cross-

- cultural norms. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 33–47). Wits University Press.
<https://doi.org/10.18772/22013015782.8>
- South African Government. (1996). *Constitution of the Republic of South Africa*.
<https://www.gov.za/documents/constitution/chapter-2-bill-rights#9>
- Spaull, N. (2012). *A Preliminary analysis of SACMEQ III South Africa*. [Master's dissertation, Stellenbosch University]. <http://hdl.handle.net/10019.1/20184>
- Spaull, N., & Jansen, J. D. (Eds.). (2019). *South African schooling: The enigma of inequality* (1st ed.). Springer International Publishing. <https://doi.org/10.1007/978-3-030-18811-5>
- Swart, E., & Pettipher, R. (2005). Framework for understanding inclusion. In E. Landsberg, D. Kruger, & N. Nel (Eds.), *Addressing barriers to learning. A South African perspective* (1st ed., pp. 3-23). Van Schaik Publishers.
- Thorne, S. (2016). *Interpretive description: Qualitative research for applied practice* (2nd ed.). Routledge. <https://www.routledge.com/Interpretive-Description-Qualitative-Research-for-Applied-Practice/Thorne/p/book/9781629582993>
- Tredoux, N. (2013). Using computerised and internet-based testing in South Africa. In S. Laher, & K. Cockcroft, (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 424–442). Wits University Press.
<https://doi.org/10.18772/22013015782.6>
- Truter, S., Mazabow, M., Morlett Paredes, A., Rivera, D., & Arango-Lasprilla, J. C. (2018). Neuropsychology in South Africa. *Applied Neuropsychology: Adult*, 25(4), 344–355.
<https://doi.org/10.1080/23279095.2017.1301453>

- Van der Berg, S., Gustafsson, M., & Malindi, K. (2020). *Education and skills for the economy and links to labour markets in South-Africa*. Report for the National Planning Commission on 7 March 2020: NPC. <http://dx.doi.org/10.2139/ssrn.4321482>
- Van der Merwe, I., De Klerk, W., & Erasmus, P. (2022). Intelligence instruments applied to South African school learners: A critical review. *Frontiers in Psychology*, 13(853239), 1–11. <https://doi.org/10.3389/fpsyg.2022.853239>
- Van Eeden, R. (1991). *The Senior South African Individual Scale - Revised (SSAIS-R)*. Human Sciences Research Council.
- Williams, G. (2019). *Applied qualitative research design*. Ed-Tech Press. <https://www.edtechpress.co.uk/details/applied-qualitative-research-design>

Phase 3 (Document 3)

**Developing a strategic guideline to design an intelligence instrument applicable to South
African school learners**

Author's Note

Manuscript planned to be submitted for publication.

Abstract

In addition to difficulties that arise when attempting to conduct culturally fair and valid assessment practices to multi-ethnic school learners (who vary in degree of acculturation, education, and socio-economic status [SES] backgrounds), South African practitioners also face the reality of having a shortage of up-to-date, culturally appropriate intelligence instruments. This qualitative document analysis aimed to develop a strategic guideline to design an intelligence instrument that is suitable for South African school learners of a multi-ethnic population and from multidiverse contexts. Applying a reflexive thematic analysis approach, two documents, Document 1 (published) and Document 2 (submitted for publication), were analysed to reveal the following themes: (i) Utilised intelligence measurements in current South African school learner context are inapplicable; (ii) Newly or adapted intelligence measures cannot really be standardised in the current South African school learner context; (iii) The current South African education system needs to be taken into consideration; and (iv) Current South African school learner contextual and demographic influences need to be taken into consideration. From these themes, steps were developed that comprise the proposed strategic framework to design applicable intelligence instruments for South African school learners. The steps include both guidance towards instrument design as well as the manner and context of its application, as these features function as interrelated entities.

Keywords: cross-cultural, fair assessment, intelligence assessment, multi-ethnic equalisation, school learners, South Africa, valid testing.

Introduction

Referred to as the rainbow nation (as coined by Archbishop Desmond Tutu), South Africa (ZA) is characterised by its multidiversity in cultures, languages, socio-economic stance (SES) environments, and scholastic systems (Sidanius et al., 2019). Attempting to administer constructive, applicable and fair intelligence assessments to scholastic learners in ZA is challenging, not only because of the diversity in its population compositions and contexts, but also the vast socio-economical, demographic, and educational changes it has undergone over the past time, with trends of acculturation towards a Westernised lifestyle (Cockcroft et al., 2015; Cockcroft & Sumaya, 2022; Shuttleworth-Edwards, 2023). Variability in degree of acculturation has caused significant variations in intelligence measured performances, where South African school learners differ essentially in terms of their language use, test-taking sophistication, level and quality of education, SES backgrounds, and contexts at home and school (Cockcroft et al., 2015; Shuttleworth-Edwards, 2023; Shuttleworth-Edwards et al., 2013). This challenge is worsened by the reality of having a shortage in neuropsychological tests that are suitable and fair to all South African school learners of a multidiverse population (Cockcroft & Sumaya, 2022).

Historic Transformation of School Learner Populations and Contexts in South Africa

During the apartheid era (1948-1994), socio-economical and educational segregation was prevalent among the four officially classified racial groups (African, Coloured, Caucasian, and Indian/Asian), where the Caucasian population group was favoured and predominantly living within higher SES contexts and receiving higher quality of education in well-resourced, privileged schools (Shuttleworth-Edwards, 2023; Sidanius et al., 2019; Te Nijenhuis et al., 2011). Today, after the democratisation of ZA in 1994 and launching of government-induced upliftment efforts, many non-Caucasian school learners have since advanced to more privileged SES living circumstances and attend well-resourced schools that

provide higher quality of education; this has consequently led to higher performances in assessments academically and intellectually, with scores almost equal to their Western, Caucasian peers (Shuttleworth-Edwards, 2023). Similar findings were seen after a government initiative to uplift Afrikaans-speaking South Africans during the apartheid era, where these school learners were placed in schools that provided higher quality of education, which yielded higher academic and intellectual performances, equivalent to their English-speaking peers (Te Nijenhuis et al., 2011). The above-mentioned findings indicate a predominant link between quality of education received at schools (within higher SES environments) and higher intelligence measured performances achieved by school learners in ZA, despite their ethnicity (Shuttleworth-Edwards, 2023; Te Nijenhuis et al., 2011).

Historic Transformation of the Psychometric Test Industry in South Africa

In the new democratic, post-apartheid ZA, legislation was passed to protect all (including those with special needs or having any contextual disadvantage) from unfair practices such as discrimination, stereotyping, or exclusion (Department of Education [DoE], 2001; Donald et al., 2000). New democratic legislation had enforced and motivated psychologists to undergo major paradigm shifts in their assessment practices on South African school learners (Foxcroft et al., 2004; Swart & Pettipher, 2005). Drawing attention to two pieces of legislation in particular: (i) the Education White Paper 6 in 2001 (introducing inclusive education and training), and (ii) the Employment Equity Act 55, section 8, in 1998 (enforcing non-discriminatory, fair and unbiased psychological assessments), required psychologists to move from medical deficit practices (i.e. labelling, segregation and fault-finding) to practices based on a social systems change approach of adjusting the social environment (i.e. the psychological assessment practices, findings and referrals) to fit the needs of the school learners, and not vice versa (Swart & Pettipher, 2005).

The Human Sciences Research Council (HSRC) served as the largest developer and distributor of psychometric tests during the apartheid era until it was restructured during the early 1990s, with significant changes in its research aims such as discontinuing their role of developing, revising, and adapting intelligence tests (Chisholm & Morrow, 2007; Foxcroft et al., 2004). Various smaller companies and university research teams have taken over the role of research in psychometric testing (test development, standardisation, adaptation, and review), but on a much smaller scale (see examples of such research studies in De Beer, 2005; Laher & Cockcroft, 2013; Shuttleworth-Edwards & Truter, 2023). Laher & Cockcroft (2014) acknowledge and note how the above-mentioned research efforts have helped to enhance the field of psychometric assessment; however, note the lingering challenges of shortages in skilled experts, financial resources, and constructive leadership in the field of test development and adaptation for a diverse population such as ZA. Shortages of skilled professionals to develop, adapt, and administrate assessments to culturally and linguistically diverse populations seem to be a challenging reality worldwide (Dutt et al., 2022).

Intellectual Measurement of School Learners in South Africa Today

Considering the applicability of Western-developed intelligence measures, which are currently administered to school learners in ZA, two distinct groups can be identified, namely the higher SES, Westernised, privileged schooled (higher quality of education received), and the lower SES, non-Westernised, less privileged schooled (lower quality of education received) group of school learners, who vary in demographics (culture and language) within these two groups (Shuttleworth-Edwards, 2023). Ethically appropriate and valid cognitive testing obligates acknowledging the influencing contextual elements (namely culture, language, SES, and quality of education) of South African testees and adapting measurements and assessment practices accordingly (Cockcroft & Sumaya, 2022). Ensuring fair and applicable intelligence measurement of South African learners is a matter of ethical

obligation (Cockcroft & Sumaya, 2022; Laher & Cockcroft, 2017) which, despite being challenging, should be investigated to help continue the imperative movement initiated and driven by the post-apartheid, democratic South African government.

Problem Statement

In the face of limited resources and multi-ethnic school learners who vary in degree of acculturation, education, and SES backgrounds, South African practitioners are politically and ethically obligated to administer culturally fair assessments, using valid and reliable test instruments (Cockcroft & Sumaya, 2022; Nel et al., 2016; Shuttleworth-Edwards, 2023). Intellectual measurements are applied as part of a full assessment process to determine diagnoses and intervention strategies when school learners present with challenges such as learning difficulties (Nel et al., 2016; Shuttleworth-Edwards, 2016). If performances from these measurements do not correlate with the school learner's true performance, then inaccurate findings and subsequent intervention plans will be executed, which will be to the detriment of the child. Therefore, a need exists to develop a guideline that would suggest how to design appropriate intellectual tests and practices that would yield true findings of multi-ethnic school learners in ZA.

Aim of the Research Study

The aim of this qualitative document analysis was to develop a strategic guideline to design an intelligence instrument applicable to South African school learners. This was accomplished by following a multimethod approach of merging the findings from literature themes (by means of a critical review; see Van der Merwe et al., 2022) and findings from interview themes (employing a qualitative interpretive description design; see Van der Merwe et al., 2023) to develop a strategic guideline. The qualitative document analysis was steered by the following research question: *Which elements should be incorporated into a*

strategic guideline to design an intelligence instrument applicable to South African school learners?

Method of Investigation

Research Design

A qualitative document analysis (Bowen, 2009; Morgan, 2022) was conducted to develop the strategic guideline. “Trustworthy ... guidelines should provide recommendations, document the development process, and highlight implementation information” (Nieuwlaat et al., 2021, p. 4721). This qualitative document analysis has received ethical approval from the Health Research Ethics Committee (HREC) of the North-West University (NWU-00191-21-A1).

Data Collection

Steered by the aim of this qualitative document analysis, data were retrieved from two documents developed in Phase 1 (Document 1) and Phase 2 (Document 2) of the PhD research study. Document 1 was published (see Van der Merwe et al., 2022) and Document 2 has been submitted for publication (Van der Merwe et al., 2023). Both research studies implied a need for intelligence instruments that are suitable to South African school learners. These studies were intentionally employed as they form part of the process of developing a strategic guideline which acts as an advisory statement for more applicable and therefore sound psychological intelligence assessment instruments applied to South African school learners.

Document 1 (Van der Merwe et al., 2022). This critical review research study (Phase 1 of PhD research study) aimed to search, critically appraise, and analyse scientific literature regarding intelligence instruments applied to South African school learners. The search initially yielded 405 studies, of which 15 (see August, 2017; Blake, 2011; Cassoojee, 2020; De Beer, 2005; Ferrett, 2011; Jansen & Greenop, 2008; Jinabhai et al., 2004; Levert &

Jansen, 2001; Mawila, 2012; Mitchell et al., 2018; Naicker, 2013; Reid et al., 2002; Shuttleworth-Edwards et al., 2013; Teixeira, 2011; Van Wyhe, 2012)] were finally included for thematic analysis. Three main themes emerged from the included studies, namely: Applicability of intelligence instruments administered to South African school learners; Contextual and demographic influences affecting performance on administered intelligence instruments; and Intellectual measuring instruments related to developmental and cognitive ability levels.

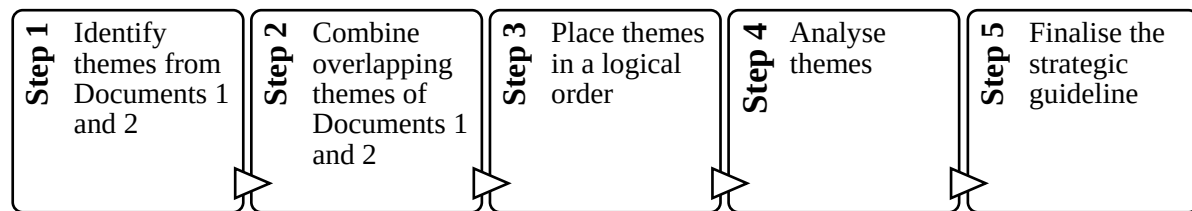
Document 2 (Van der Merwe et al., 2023). The aim of this qualitative interpretive description research study (Phase 2 of PhD research study) was to investigate the experiences of both experts in intelligence test development/adaptation and psychologists/psychometrists who have administered intelligence tests to South African school learners in various contexts. Twelve psychologists/psychometrists were interviewed, of which six were also experts in test development/adaptation. Findings from reflexive thematic analysis uncovered four themes: (i) Utilised intelligence measurements in the current South African school learner context is not relevant anymore; (ii) South African education system is a major issue specifically within lower SES contexts; (iii) Newly or adapted intelligence measures cannot realistically be standardised in the current South African school learner context; and (iv) Key informants' recommendations from their experiences.

Data Analysis

In this qualitative document analysis, reflexive thematic analysis, as described by Braun and Clarke (2021) and Byrne (2022), was applied whilst pursuing the following five steps (illustrated in figure 1): *Step 1*: Identify themes from both Document 1 (themes from literature) and Document 2 (themes from experiences of psychologist, psychometrist, and test expert participants); *Step 2*: combine overlapping themes of Documents 1 and 2; *Step 3*: place themes in a logical order to form a draft strategic guideline; *Step 4*: analyse themes by

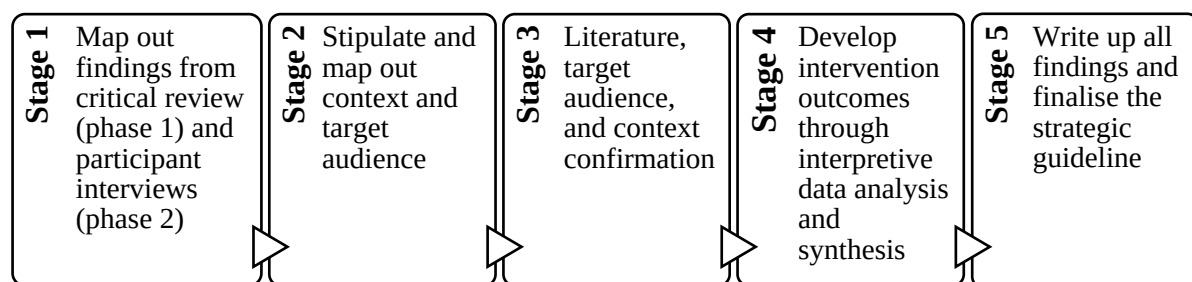
applying Clarke and Braun’s (2013) qualitative thematic data analysis approach and analyse data interpretively thorough reading, coding and theme development; *Step 5*: finalise the strategic guideline by ensuring that it includes the elements of transparency, clarity, comprehension and transferability to various psychological assessment contexts.

Figure 1: *Five-step Procedure for Qualitative Document Analysis*



The five-step procedure contained a five-staged method which was followed when developing the strategic guideline, as illustrated in figure 2. This method was developed from the guideline development methods followed by the World Health Organization (WHO, 2014).

Figure 2: *Five-staged Method Followed for Guideline Development*



The five-staged method followed to develop the strategic guideline included (1) *stage 1* and (2) *stage 2*, where the findings of phases 1 and 2 as well as the context and target audience were mapped out on a visual display. Then (3) *stage 3* commenced, where the elements mapped out in *stage 1* (reviewed literature and participant experiences) were highlighted after weighing them up against the context and audience targeted by the interventions recommended in the strategic guideline (elements of *stage 2*). Highlighted

elements allowed for confirmation. (4) *Stage 4* entailed thematic interpretive data analysis and synthesis where the highlighted elements were considered critically and interpretively to identify and create new findings that could serve as intervention outcomes. PICO-questions (WHO, 2014) were additionally asked during this stage, namely questions regarding the *Population* (who is targeted by the recommended intervention), *Intervention* (the action being considered), *Comparator* (any alternative choices of action), and *Outcomes* (considering the purpose of the recommendation). (5) *Stage 5* entailed writing up all the findings of article/phase 3 in the form of a strategic guideline and finalising the proposed procedure of article/phase 3.

Rigour

Rigour was obtained by following Guba's 1981 trustworthiness model, as outlined by Krefting (1991). This entailed ensuring credibility through accurate and truthful reporting of findings, with the monitoring and guidance of promoters; emphasizing transferability with clear and comprehensive descriptions of themes and the strategic guideline and how it can be applied to other contexts; maintaining confirmability by applying structured methods for reliability; and demonstrating dependability by keeping an audit trail, utilizing co-coders, and seeking guidance from reviewers to enhance relevancy and accuracy, while also mitigating researcher bias and the impact of preconceived notions during data interpretation and handling.

Findings and Discussion

Four main themes with subthemes emerged from the documents analysed (*refer to Table 1*). These identified themes served as baseline from which the strategic guideline was developed.

Table 1*Themes Identified after Analysis of the Two Documents*

Theme 1:	Utilised intelligence measurements in current South African school learner context are inapplicable
Subthemes:	1.1 Outdated 1.2 Demographically inapplicable 1.3 Contextually inapplicable
Theme 2:	Newly or adapted intelligence measures cannot really be standardised in the current South African school learner context
Subthemes:	2.1 Translation challenges 2.2 Norming and standardisation challenges
Theme 3:	The current South African education system needs to be taken into consideration
Theme 4:	Current South African school learner contextual and demographic influences need to be taken into consideration
Subthemes:	4.1 Needed input from diverse groups represented in ZA 4.2 Optimal standardisation and updating of measurements 4.3 Selection of applicable instruments 4.4 Constructive interpretation of test performance and consequent diagnosis and intervention plans 4.5 Optimal manner in which intelligence assessment is conducted

Literature in Document 1 (Van der Merwe et al., 2022) and participants' experiences in Document 2 (Van der Merwe et al., 2023) revealed that administered intelligence test instruments were unsuitable to the present, multi-ethnic South African school learners, when considering their unique and modern contexts.

Theme 1: Utilised Intelligence Measurements in Current South African School Learner Context are Inapplicable

The inapplicability of intelligence measurements could be ascribed to the available instruments differing from the demographics and modern contexts of school learners in ZA. Administration of internationally and locally (many outdated) developed intelligence tests have yielded unequal test performances from multi-ethnic school learners because instruments were developed by experts with differing cultures and contexts, normed on dissimilar populations (with unrelated cultures, languages, contexts, and sometimes time

frames), making these intellectual test instruments inapplicable (Cockcroft & Sumaya, 2022; Dutt et al., 2022; Laher & Cockcroft, 2017; Shuttleworth-Edwards, 2023).

As the largest psychometric test developer and supplier, the HSRC has helped to develop the groundwork for South African local psychological testing today (Laher & Cockcroft, 2014; Meiring, 2007). After the HSRC closed their test development research department, there had been constructive research efforts in the field of psychometric measurement development and standardisation, but on a much smaller scale, adding to the shortage of cross-culturally suitable, up-to-date neuropsychological tests (Cockcroft & Sumaya, 2022; Foxcroft, 2004; Laher & Cockcroft, 2014; Lucas, 2013; Shuttleworth-Edwards et al., 2013; Shuttleworth-Edwards & Truter, 2023).

Outdated

Participants in Document 2 disclosed that, because the HSRC discontinued large-scale research projects within schools in ZA, utilised intelligence instruments have become outdated (with outdated test items, graphics, language use, and norms) and inapplicable, especially in view of the present South African school learner's modern world of living. One participant highlighted the historic trend of segregation in ZA and argued that if the psychology departments of different universities, that function as separate entities, had only collaborated forces, then ZA would have been able to develop sufficient intelligence instruments by now. In Document 2 it was also mentioned that even though outdated research has caused many commonly employed intelligence measurements to become irrelevant, the tests still remain valid, as the researched theoretical base has not disappeared. According to the literature in Document 1, mention was made of intelligence assessment instruments being valid and reliable because they retained sound psychometric properties; however, needed to be updated, adapted, and re-normed to appropriately fit the local school learner population being measured. Authors in Document 1 furthermore noted the essential need to update

norms of imported intelligence instruments. This was concurred by Shuttleworth-Edwards (2023) and Cockcroft and Sumaya (2022), stating that administered neuropsychological measurements need to be standardised with locally appropriate norms that are contextually and culturally representative of the current South African population being tested.

Demographically Inapplicable

Performance disparities could be found across different cultural groups as certain test items might hold different meanings for various cultural groups and/or the school learners may not be tested in their primary language (Shuttleworth-Edwards, 2023). In ZA, there are twenty-eight languages spoken (with 12 officially recognised languages) and many of the country's school learners are multilingual, with not all equally proficient in the language of testing, which is mainly English (Cockcroft & Sumaya, 2022). With few existing neuropsychological tests in indigenous languages, practitioners often need to employ practices such as translating test instruments, providing additional testing time, or appointing translators (where professional translators are not always available) while assessing (Cockcroft & Sumaya, 2022). According to articles critically reviewed in Document 1 and participant comments in Document 2, unfair intelligence assessment practice was noted when considering the multilingual and multicultural formation of the local school learner population group. Both documents viewed these locally administered intelligence tests as unsuitable to South African school learners as measurements were developed and normed on other, differing populations and contexts; school learners' performance on tests could be hindered due to elements such as unfamiliar language or graphics found in tests, cultural differences in approaching timed tests, and more. In a research study exploring the ethical challenges experienced by psychologists who assessed non-Caucasian school children in ZA, dilemmas identified included "language, cultural knowledge, test-wiseness, confidentiality and communication with parents" (Bayi, 2010, p. 64). Shuttleworth-Edwards (2023)

mentions how diagnostic and intervention applications could be inaccurate when administering Western-developed and normed cognitive tests, as they differ from the non-Westernised cultures found in ZA. The inapplicability of Western-developed tests holds the concern of being loaded with the cultural bias due to influencing elements of the test developers (including their understanding and view of the construct of intelligence) and the population used when norming the tests (Bayi, 2010). Dutt et al. (2022) are of opinion that neuropsychological tests that are developed and normed on Western, mono-cultural, well-educated, English-speaking population groups are inapplicable and should not be administered to non-Western, multicultural and multilingual groups.

Contextually Inapplicable

Both documents mentioned how school learners' performance on administered intelligence instruments could be affected negatively by unfamiliar test language and content (such as certain graphics or scenarios) that do not reflect the school learners' current world of living. Additional remarks in both documents stated how differences in the school learners' contexts (including educational, social, and cultural backgrounds) and thus variances in exposure to language and information would yield differing performances, advising careful interpretation of test scores. Test unsuitability was also noted by Shuttleworth-Edwards (2023), who explained how cognitive assessment is invalid when disparities occur among the various contexts in which South Africans reside, varying from the non-Western impoverished areas to more Western-developed advantaged areas. Administering measurements developed and normed in Western contexts to persons from a disadvantaged, non-Western background (with poorly resourced, lower quality of schooling), would be unfair as their test performances would be hindered by lower levels of literacy and test-taking sophistication, as well as unfamiliarity to test content and language use (Bayi, 2010; Dutt et al., 2022; Shuttleworth-Edwards, 2023).

In view of the above-mentioned statements, it appears improbable for intelligence instruments to be standardised fairly in order to suite school learners in ZA.

Theme 2: Newly or Adapted Intelligence Measures Cannot Realistically be Standardised in the Current South African School Learner Context

Translation Challenges

Intellectual assessment in South Africa has the significant challenge of the country having all its multiple races, cultures, and languages scattered among contexts varying in quality of education and level of socio-economic stance (Shuttleworth-Edwards, 2023). It was evident from Documents 1 and 2 that it might be impossible to standardise intelligence measures for school learners in ZA, especially when considering their multidiverse contextual backgrounds. Both documents noted challenges to standardising intelligence measures for school learners with multiple languages and dialects (which include test translation and norming difficulties) and differing levels in quality of education. Influencing elements of differing quality of education, language and culture would most likely result in test performances that do not reflect the testee's actual ability, causing incorrect diagnoses and suggested interventions (Dutt et al., 2022; Laher & Cockcroft, 2017). Dutt et al. (2022) raise difficult questions regarding influencing contextual and cultural elements that may result in biased assessment outcomes, as well as query assessment validity if practitioners were to deviate from the norm when administering tests.

Norming and Standardisation Challenges

Some participants in Document 2 questioned the probability of collecting representative norm samples which require excessive resources, especially after the government-supported HSRC was transformed and discontinued large-scale research projects within school environments across the whole of ZA. Since the commencement of the post-apartheid government, the HSRC has lost its government funding and underwent drastic

changes in staff, management, relationships with government (specifically the DoE) and universities, as well as its research aims and activities (Chisholm & Morrow, 2007).

According to Lucas (2013), test development and adaptation has declined drastically due to large costs and the HSRC changing its roles, such as discontinuing the development of local neuropsychological tests.

Theme 3: The Current South African Education System Needs to be Taken into Consideration

Document 1 reported on research findings of a downward trend in performance on intelligence tests related to lower quality of education received at schools, regardless of the learners' ethnicity and, as stated in one study, irrespective of their home language (see Van Wyhe, 2012). Document 2 concurred by observing substandard education provided at schools located within lower SES environments which hindered the learners' abilities to perform on intelligence tests. Dutt et al. (2022) mention how higher cognitive skills (which are required to perform in intelligence tests) are attained within contexts of learning such as schools, where the quality and type of educational exposure would predict intellectual test performance. Intelligence tests administered to school learners from a disadvantaged educational background need to be adapted adequately while being wary of over or under-exaggerated scores when interpreting and reporting on findings (Shuttleworth-Edwards, 2023). Western-developed and normed tests like Wechsler intelligence tests have been found suitable to school learners from advantaged educational backgrounds, irrespective of their race, with norms from these school learners being very similar to the American-developed norms (Shuttleworth-Edwards, 2023).

Theme 4: Current South African School Learner Contextual and Demographic Influences Need to be Taken into Consideration

It was evident from both documents that when selecting, adapting, or developing intelligence instruments for school learners in ZA, both their demographic elements and environmental backgrounds need to be considered to enable fair assessment practices.

Input Needed from Diverse Groups Represented in South Africa

Foxcroft (2004) suggests that the development/adaptation of a psychological measurement for multi-ethnic testees in ZA should be conducted by a multidiverse team with representatives of all language and cultural groups. This notion is concurred by the ITC (2018) stating that developers, adapters, as well as reviewers of tests for linguistically and culturally diverse populations need to be knowledgeable and skilful in the target languages and cultures. Having diversity in a team has proven to yield benefits of elevated performance, innovation, problem-solving ability, and productivity by tapping into a larger talent pool (Servaes et al., 2022). Participants in Document 2 suggested assembling a team comprising representatives from all the varying cultural and language groups to design an intelligence measurement instrument which is suitable to the multilingual, multicultural school learners of ZA; to do this, the term ‘intelligence’ should first be defined as novel construct within the unique multidimensional context of South African school learners and then be operationalised into a measuring instrument. Document 2 additionally created awareness of obstacles stakeholders have experienced when employing this process, attributing it to their difficulties to move past former negative experiences in this regard. Participants in Document 2, however, remained positive and suggested attempting this project with tolerance and acceptance; joining of forces between various research institutions in ZA was also suggested.

Optimal Standardisation and Updating of Measurements

Despite the shortage of culturally relevant intelligence tests in ZA, academics have standardised some neuropsychological measurements for local use that would allow performances that reflect school learners' abilities more accurately. According to Shuttleworth-Edwards (2023), research has proven Western-developed intelligence tests suitable to Westernised South Africans. Although ZA has the challenge of limited resources, it is imperative that intelligence test instruments administered to non-Westernised individuals be adapted and standardised appropriately (Cockcroft & Sumaya, 2022; Shuttleworth-Edwards, 2023). Cockcroft and Sumaya (2022) advise following the cross-culturally fair assessment guidelines provided by the International Test Commission when standardising and adapting neuropsychological instruments. Documents 1 and 2 also recommend that administered imported and local measurements need to be standardised with updated and adequate norms, language use, and test items that reflect the South African school learners' demographics, quality of education, and modern, diverse backgrounds to be valid and reliable; this would require continuous normative and measurement adaptation studies on all learner subgroups across ZA.

Al-Jawahiri and Nielsen (2021, as cited in Dutt et al., 2022) have found higher performances from multilingual, multicultural persons who had higher levels of acculturation, and recommended developing appropriate norms that consider acculturation variables. As quality of education has been found to have one of the highest impacts on neuropsychological test performance, it is suggested to adapt well-researched, commonly used cognitive tests according to demographically relevant within-group norms (and not population-group norms) that are stratified according to quality of education (Fernández, 2022; Shuttleworth-Edwards, 2023).

Selection of Applicable Instruments

Both documents advised considering the school learner's background, including their environment, demographics, type of schooling, and test-sophistication before choosing intelligence measurements to administer; the instrument should accommodate and represent these elements to enable fair, unbiased assessment practices. Both documents specifically brought awareness to cultural differences in approaching timed tests, where many African cultures would rather act responsibly (taking their time) than swiftly and how this notion should be considered during the selection of test instruments and subtests. Dutt et al. (2022) mention cross-cultural differences when performing test tasks of processing speed due to differing views regarding the construct of time and speed, tasks of digit span and verbal fluency that are related to linguistic properties (differing syllabic length of words) and differing cognitive processing styles (holistic, with attention to context vs. analytical, excluding contextual information). Dutt et al. (2022) suggest practitioners demonstrating so-called "cultural competence", by taking cognisance of the testee's ethnic background to select applicable tests, score and interpret them appropriately, and communicate findings effectively.

Document 1 reported research findings of translated versions of local intelligence instruments Junior South African Individual Scales (JSAIS) having sound psychometric properties; however, in need of updated, applicable norms and test items (familiar or related to the learners' demographics, world of living, and educational background) to be suitable and fair to the school learner in ZA. There was additional mention in Document 1 of the locally developed LPCAT being standardised and validated using multicultural samples from multidiverse contexts. Regarding international intelligence tests, Document 1 noted research findings of the Kaufman cognitive measurements to be valid, reliable, and suitable to the school learners of ZA. After comprehensive intelligence studies of determining correlations

among learners' abilities in cognition, neuropsychological processing, and academic tasks, the Kaufman test batteries were based upon the dual-theoretical foundation of Cattell-Horn-Carroll (CHC) psychometric theory of cognitive abilities and Luria's neurological theory of processing, which lead to the instrument having validity, reliability, and cross-cultural applicability (Kaufman et al., 2018). Based on the intelligence theory, the Wechsler batteries are the leading cognitive ability measures in the world and of the most frequently administered tests by South African psychologists (Cassoojee, 2020). Comparative analysis of the Kaufman Assessment Battery for Children, Second Edition (KABC-II; Kaufman & Kaufman, 2004) and Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V; Wechsler, 2014) on school learners in rural contexts in ZA, have proven high construct validity and reliability, indicating optimal suitability to local, multi-ethnic school learner populations from lower SES backgrounds (Cassoojee, 2020; Mitchell et al., 2018). For construct validity in psychological measuring instruments, Stone (2021) recommends ensuring that the measurement's epistemic goals fit its underlying theory. The goal of intelligence measurement should be to yield findings that reflect true performances, upon which appropriate diagnoses and interventions could be drawn (Cockcroft & Sumaya, 2022; Edwards & Young, 2013; Shuttleworth-Edwards, 2023).

Constructive Interpretation of Test Performance and Consequent Diagnosis and Intervention Plans

Document 1 and 2 commented on varied test performance results due to environmental, demographic, and scholastic background differences. Both documents mentioned how, for this reason, interpretation of results and consequent diagnoses and intervention plans need to be carried out sensibly, especially when a school learner comes from a school within a lower socio-economic context with lower quality of education or when the administered measurement had cultural or linguistic biased elements. When measuring

the intelligence of school learners from a disadvantaged SES and educational background, caution should be taken when interpreting and reporting on findings, as biases that form within lower SES contexts (i.e. lower quality of education, poor parental education, poor nutrition and health care, or exposure to violence) would have a negative, unfair effect on learners' performance (Cockcroft & Sumaya, 2022; Mitchell et al., 2018; Shuttleworth-Edwards, 2023). There is a need to carefully interpret scores for diagnoses and referrals after assessing multicultural and multilingual learners using intelligence tests that are not culturally fair or suitably standardised, as findings are likely not to reflect the school learner's true ability (Cockcroft & Sumaya, 2022).

Optimal Manner and Context in which Intelligence Assessment is Conducted

Administering intelligence assessment to multi-ethnic school learners often brings about the challenging debate between choosing appropriate response to diversity (that could compromise test validity) versus adhering to the standardised testing principles set to ensure test validity (Edwards & Young, 2013; Laher & Cockcroft, 2017). Edwards and Young (2013) suggest creating optimal assessment contexts and practices when working with multi-ethnic populations from differing contexts, by adding the principals of flexibility and qualitative investigation that are responsive and sensitive to the testee's unique features and multicultural background. Participants in Document 2 have mentioned how practitioners need to conduct positive and constructive assessment contexts and practices, not only during but also before (preparation) and after the assessment process.

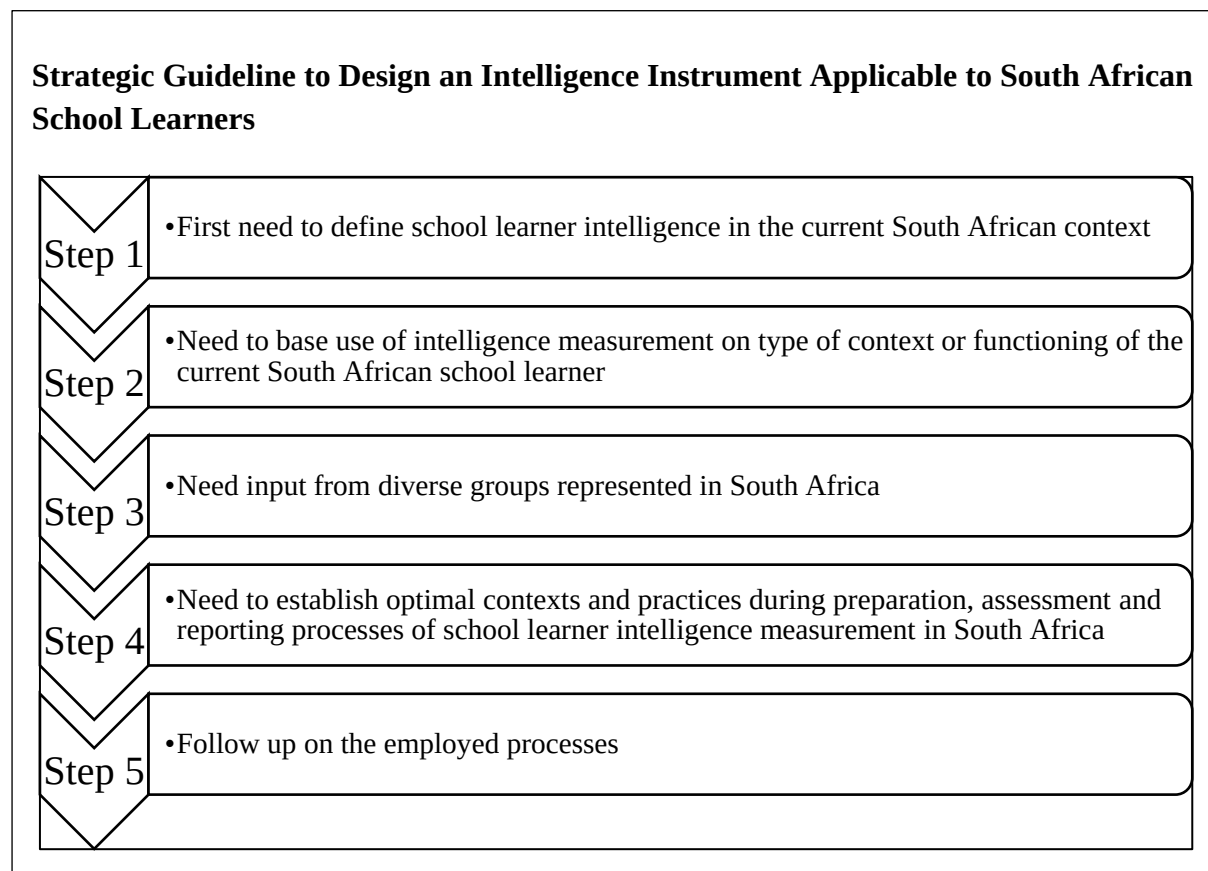
Some participants in Document 2 mentioned laying the groundwork through discussions and networking with relevant parties of the community, inquiring any influencing challenges (e.g. being hungry, travelling far, family difficulties etc.), preparing school learners to be assessed, as well as managing any power imbalances that may occur to ensure fair practices. Broesch et al. (2020) advise inclusion of the local community to participate in

essential stages of the assessment project, especially during the process of preparation. In view of the history of racial tensions in ZA, Cockcroft and Sumaya (2022) recommend incorporating practices that prove consideration of any power relations between the administrator and testee to yield optimal responses and performances in neuropsychological measurements.

Proposed Strategic Guideline to Design an Intelligence Instrument Applicable to South African School Learners

At the beginning of post-apartheid ZA, South African psychologists, psychometrists, and test developers/adaptors realised the need and obligation for psychometric testing that is valid and fair to all (see Foxcroft, 1997, 2004, 2011; Foxcroft et al., 2004; Lucas, 2013). During this time, Foxcroft (1997) published an article which provided essential elements to be considered by a mixed panel of experts during test design and planning for multicultural assessment, namely (a) test purpose and rationale, (b) implications of test design related to testee characteristics, (c) intelligence defined and operationalised from a cross-cultural perspective, (d) framework guiding content development and test specifications, (e) test format, presentation, and response modes, and (f) administration and scoring methods. Many of these features, as well as the above-mentioned themes, have been reflected and built upon to develop the following strategic guideline to design applicable intelligence instruments for South African school learners.

Figure 3: *Steps of Strategic Guideline as Identified from Themes*



The strategic guideline, as illustrated in figure 3, consists of five steps.

Step 1: First Need to Define School Learner Intelligence in the Current South African Context

The first strategic guideline step suggests defining the concept intelligence of South African school learners within their present contexts. Development of an intelligence measuring instrument should commence by defining the construct being measured (namely intelligence) and then establishing construct validity, namely determining whether the instrument measures the construct it intends to measure (Stone, 2021). This definition would then form part of the underlying theoretical framework, in combination with relevant theories adopted from other intelligence tests, which indirectly inform the designing and validation of intelligence instruments (Stone, 2021). With various existing conceptualisations of

intelligence, the constructs of fluid and crystallised intelligence, as proposed by Cattell (1967), have been found most relevant when referring to multi-ethnic, school-going learners who are still undergoing developmental and cognitive changes and residing in differing contexts (Kaufman & Kaufman, 2018; Simpson-Kent et al., 2020). The KABC-II NU (Kaufman & Kaufman, 2018) measuring instrument presents as a good example, being grounded in the dual-theoretical foundation of the CHC and Luria's theory to provide assessors the flexibility to choose between measuring crystalised and fluid intelligence of scholastic learners, depending on their contextual background; these theories are based upon intelligence research of determining correlations among learners' abilities in cognition, neuropsychological processing, and academic tasks (Kaufman et al., 2018). It is imperative to conceptualise the construct of intelligence within the relative cultural context; note that intelligence is understood differently in Western cultures (an abstract concept with focus on cognitive capabilities) than in African cultures (emphasis on social behaviour that advances the collective) (Bayi, 2010).

Step 2: Need to Base Use of Intelligence Measurement on Type of Context or Functioning of the Current South African School Learner

Step 2 can be followed by applying the PICO model (Richardson et al., 1995) in the manner as described by WHO (2014). Firstly, *Population* describes South African school learners according to their relevant demographic characteristics of age, gender, language, health, culture, and other contextual elements (educational, socio-economic, geographic, and social) that affect this population group (WHO, 2014). It also depicts acculturation variables where one would take into account the group's culture according to their ancestral traditional lifestyles and the modern environment with its influencing social and economic elements (Broesch et al., 2020). Secondly, *Intervention* considers intelligence measurement in terms of its efficacy, construct validity, reliability, fairness, and fit according to the school learner

context and functioning, whilst keeping the best interest of each school learner in mind (ITC, 2018; Stone, 2021; WHO, 2014). For fairness, the test items should be familiar and appropriate, and test language used should be clear for both the administrators and testees (ITC, 2018). Thirdly, *Comparator* compares the newly designed instrument to other intelligence instruments to gather existing information to be integrated and built upon (Stone, 2021; WHO, 2014). Lastly, *Outcomes* report on test performance (i.e. interpreting results and suggesting interventions such as school/class placement or diagnosis) which should be done in a just and responsible manner of keeping the school learner context and demographics in mind and questioning the potential benefits, harms, and impact on fairness and equity among subgroups or individuals (Stone, 2021; WHO, 2014).

Step 3: Need Input from Diverse Groups Represented in South Africa

Designing of the intelligence measurement should be done by a diverse team with members representing multiple groups found in ZA. Team representatives should be from various relevant regions and departments who deliver a variety of skills, perspectives, and roles (WHO, 2014). A diverse team comprising multi-ethnic members holds benefits of enhanced levels of performance, innovation, representivity, equalisation, and counteracts bias (Servaes et al., 2022). Practitioners may unwarily be influenced by their own, ethnic backgrounds when making essential interpretations and decisions, arguing as to why a diverse group of individuals with a variety in ethnicity and contexts is recommended (Laher & Cockcroft, 2017). As mentioned earlier in this paper (see themes), when research teams join forces across various universities, departments, and companies in ZA, it could help bridge the challenge of limited resource supply. When working as a diverse team, Servaes et al. (2022) suggest creating a safe and constructive environment by emphasising notions of diversity, inclusion, and belonging that will allow members to express their ideas freely.

When designing intelligence tests, it is important to note the manner and context in which the instrument will be applied., as this will have an impact on the design of the instrument.

Step 4: Need to Establish Optimal Contexts and Practices During Preparation, Assessment, and Reporting Processes of School Learner Intelligence Measurement in South Africa

When working with multi-ethnic populations, Broesch et al. (2020) recommend conducting ethical and culturally appropriate practices. Interacting with cross-cultural school learners should be grounded on “principles of intercultural tolerance and mutual enrichment” (Dichek et al., 2021, p. 210). Applying transformational leadership (influencing others by inspiring and involving them in the tasks at hand) with cultural intelligence (ability to self-reflect and act with insight when interacting with a differing culture) holds promise of creating optimal cross-cultural interactions and healthy environments (Velarde et al., 2022) before, during, and after intelligence measurement practices.

Including the community to participate in the assessment, specifically during the process of preparation, should yield optimal outcomes (Broesch et al., 2020). Particularly during the preparation stage, adequate time should be allowed to explain and take questions from learners and other stakeholders regarding intelligence measurement, gain context-specific knowledge from community members, and ensure obtaining dynamic informed consent through an active community-level discussion (Broesch et al., 2020). Cross-cultural assessments have a higher risk of failing to establish measurement invariance with varying groups portraying response and performance differences to test content and items in intelligence tests (Bader et al., 2021). Therefore Bader et al. (2021) suggest identifying relevant sources of bias, such as method bias (administration of the measuring instrument), item bias (differing interpretation of item content), or language bias (translated tests or multilingual school learners). Gain insight from members of the above-mentioned diverse

team (representatives of particular cultures) on how to interpret and apply the performance and results achieved by school learners from differing cultures and contexts (Broesch et al., 2020).

In order to obtain meaningful and true interpretations from multi-ethnic assessments and draw up appropriate diagnoses, recommendations and intervention plans (e.g. placement in a special needs classroom or school), practitioners need to ensure that they do not impose clinical theories on findings that do not reflect information presented by the testee (Cockcroft & Sumaya, 2022; Edwards & Young, 2013; Laher & Cockcroft, 2017). It is advised that the assessor be attentive and responsive to the testees' non-verbal behaviours (i.e. speech volume, speed and intensity, posture and mannerisms, clothing, and punctuality) that could be influenced by their cultural, SES, educational and home backgrounds (Cockcroft & Sumaya, 2022; Edwards & Young, 2013; Laher & Cockcroft, 2017). Furthermore, they have to be attentive and sensitive to any issues that may arise from cultural or contextual differences and carefully manage any likely power imbalances between the assessee, assessor, and/or other relevant parties, to allow learners the opportunity for optimal test response and performance (Cockcroft & Sumaya, 2022; Edwards & Young, 2013). Practitioners can utilise resources identified from the testee's environment and test performance during assessment and intervention planning (Edwards & Young, 2013).

Step 5: Follow up on the Employed Processes

The processes of designing and implementing intelligence instruments should be accompanied by continuous monitoring, evaluation, and review which could be conducted by an appointed monitoring and review team (WHO, 2014). Each selected stakeholder's relevancy, manner, and level of involvement in this follow-up process should be determined (Boadu & Ile, 2019). When working with multi-ethnic populations, the participatory monitoring and evaluation (PM&E) approach is proposed for this follow-up process, as it

poses the following prospective benefits: (1) active participation of all stakeholders (i.e. professionals, academics, the learners, their guardians, and other relevant members of the community); (2) prospect to manage any power disparities that may exist; and (3) higher probability for successful outcomes (Boadu & Ile, 2019).

The team should appraise newly designed intelligence instruments by aiming towards construct validity to ensure fair testing for all learner population groups (Stone, 2021). This could be attained by following the culture, comprehension, and translation bias (CCT) procedure, as introduced by Bader et al. (2021), when designing, standardising, and reviewing measurement instruments. With the CCT procedure, measurement invariance is aspired by identifying the effects of cultural and language bias in tests and then amending those elements until equivalence is reached across cultural groups (Bader et al., 2021). The CCT procedure could be implemented and appraised via continuous standardisation and review of measurement instruments as well as PM&E feedback received from testees and other relevant stakeholders during and after assessment.

Implications

Administration of culturally fair and sound intelligence tests to school learners in a heterogeneous South African society with various contexts is challenging; however, imperative. Findings from the qualitative document analysis indicated how intelligence measurements and assessment practices could be made more applicable to South African school learners, provided that their demographics and contexts (particularly educational and SES backgrounds) are considered and incorporated into the processes. This, however, needs to be done without compromising the validity of the instrument; it is recommended that the test be based on a theoretical framework, designed uniquely for South Africans and by South Africans (in the form of a multidiverse team). Other than ensuring a valid, reliable, and optimally designed and/or selected intellectual instrument, the manner and context in which

this instrument is applied during assessment practices should be regarded equally important, employing practices that include transformational leadership, employing sensitivity and responsiveness, managing any power imbalances, adding flexibility and qualitative inquiry, and conducting ethically and culturally appropriate practices before, during, and after intelligence assessment.

Limitations and Recommendations

Themes were collected after analysing two research studies (Documents 1 and 2), from which the strategic guideline was created. This qualitative document analysis was limited due to the smaller yield of articles after literature search (see Van der Merwe et al., 2022) and small number of participants (Van der Merwe et al., 2023). Literature in Document 1 was limited to intelligence measurements administered to South African school learners. Participants included in Document 2 were only professionals allowed to and with experience of administering and/or adapting intelligence tests to school learners in South Africa. Although representative of all nine provinces in ZA, data gathered were only from the experienced viewpoint of a selected, smaller number of psychometrists and psychologists. For richer data, more professionals as well as other relevant role players involved in intelligence assessment of local school learners could be interviewed. It is proposed that when employing the suggested strategic guideline to design applicable intelligence instruments (developed from this study's qualitative document analysis), it is evaluated to ascertain its efficiency, applicability, validity, and reliability.

Conclusion

Following the aim of this qualitative document analysis, a five-step strategic guideline was developed which provided information to practitioners, in the field of intelligence assessment, on how to design an intelligence assessment instrument that is applicable to South African school learners. It is imperative to note that the manner and context of

implementing the intelligence test instrument is just as important as the design itself. The steps introduced were: (1) Defining school learner intelligence in the current South African context; (2) Selecting a suitable measurement according to the learner's context and functioning; (3) Receiving input from a multidiverse team; (4) Establishing optimal assessment contexts and practices; and (5) Follow up on the processes applied. To accomplish fair and valid intelligence assessment to multi-ethnic school learners in ZA, practitioners should follow this guideline, to not only yield ethical practice, but also ensure positive assessment experiences and appropriate intervention plans that would benefit the lives of each and every assessed learner, despite their culture, language, or contextual background.

References

- August, J. O. (2017). *A normative study of the Raven's Coloured Progressive Matrices for South African children with cognitive barriers to learning* [Doctoral dissertation, Nelson Mandela Metropolitan University].
<https://core.ac.uk/download/pdf/160603144.pdf>
- Bader, M., Jobst, L. J., Zettler, I., Hilbig, B. E., & Moshagen, M. (2021). Disentangling the effects of culture and language on measurement noninvariance in cross-cultural research: The culture, comprehension, and translation bias (CCT) procedure. *Psychological Assessment*, 33(5), 375–384. <https://doi.org/10.1037/pas0000989>
- Bayi, T. L. (2010). *An exploratory investigation of the common ethical dilemmas experienced by psychologists assessing Black African school children* [Master's dissertation, University of KwaZulu-Natal]. <http://hdl.handle.net/10413/7527>
- Blake, B. M. (2011). *A Rasch Model Analysis of the Items on the VIQ8 Scale of a Sesotho Translated Version of the JSAIS* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28376972).
- Boadu, E. S., & Ile, I. (2019). Between power and perception: Understanding youth perspectives in participatory monitoring and evaluation (PM&E) in Ghana. *Evaluation and Program Planning*, 77(101683), 1-8.
<https://doi.org/10.1016/j.evalprogplan.2019.101683>
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27–40. <https://doi.org/10.3316/QRJ0902027>
- Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, 18(3), 328-352.
<https://doi.org/10.1080/14780887.2020.1769238>

- Broesch, T., Crittenden, A. N., Beheim, B. A., Blackwell, A. D., Bunce, J. A., Colleran, H., Hagel, K., Kline, M., McElreath, R., Nelson, R. G., Pisor, A. C., Prall, S., Pretelli, I., Purzycki, B., Quinn, E. A., Ross, C., Scelza, B., Starkweather, K., Stieglitz, J., & Mulder, M. B. (2020). Navigating cross-cultural research: Methodological and ethical considerations. In *Proceedings of the Royal Society B: Biological Sciences*, 287(1935), 1245-1252. Royal Society Publishing.
<https://doi.org/10.1098/rspb.2020.1245>
- Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality and Quantity*, 56(3), 1391–1412. <https://doi.org/10.1007/s11135-021-01182-y>
- Cassoojee, Z. (2020). *Comparative analysis of test performance of South African learners on indexes/scales of the Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V) and the Kaufman Assessment Battery for Children, Second Edition (KABC-II)*. [Masters dissertation, University of the Witwatersrand].
<https://wiredspace.wits.ac.za/server/api/core/bitstreams/261c5b4e-295d-4be9-b759-26f2dae0a71b/content>
- Cattell, R. B. (1967). The theory of fluid and crystallized general intelligence checked at the 5-6 year-old level. *British Journal of Educational Psychology*, 37(2), 209–224.
<https://doi.org/10.1111/j.2044-8279.1967.tb01930.x>
- Chisholm, L., & Morrow, S. (2007). Government, universities and the HSRC: A perspective on the past and present. *Transformation: Critical Perspectives on Southern Africa*, 63(1), 45–67. <https://doi.org/10.1353/trn.2007.0015>
- Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, 26(2), 120–123.
<https://uwe-repository.worktribe.com/output/937596>

- Cockcroft, K., Alloway, T., Copello, E., & Milligan, R. (2015). A cross-cultural comparison between South African and British students on the Wechsler Adult Intelligence Scales third edition (WAIS-III). *Frontiers in Psychology*, 6(00297), 1-11.
<https://doi.org/10.3389/fpsyg.2015.00297>
- Cockcroft, K., & Sumaya, L. (2022). Culturally responsive neuropsychological assessment in South Africa. In F. Irani (Ed.), *Cultural diversity in neuropsychological assessment: Developing understanding through global case studies* (1st ed.). Routledge.
<https://doi.org/10.4324/9781003051862-85>
- De Beer, M. (2005). Development of the Learning Potential Computerised Adaptive Test (LPCAT). *South African Journal of Psychology*, 35(4), 717–747.
<https://doi.org/10.1177/008124630503500407>
- Department of Education (DoE, South Africa). (2001). *Education White Paper 6: Special Needs Education Building an Inclusive Education and Training System*. DoE.
<http://www.education.gov.za/LinkClick.aspx?fileticket=gVFccZLi/tI=&tabid=191&mid=484>
- Dichek, N. P., Kopotun, I. M., Shevchenko, S. M., Antonets, N. B., & Pohribna, D. V. (2021). Implementation of the cross-cultural approach in the modern school. *International Journal of Learning, Teaching and Educational Research*, 20(4), 210–244. <https://doi.org/10.26803/IJLTER.20.4.12>
- Donald, D., Lazarus, S., & Lolwana, P. (2000). *Educational Psychology in social context. Challenges of development, social issues, & special need in southern Africa*. Oxford University Press.
- Dutt, A., Evans, J., & Fernández, A. L. (2022). Challenges for neuropsychology in the global context. In *Understanding Cross-Cultural Neuropsychology* (pp. 3–18). Routledge.
<https://doi.org/10.4324/9781003051497-2>

- Edwards, D., & Young, C. (2013). Assessment in routine clinical and counselling settings. In S. Laher, & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 320–335). Wits University Press.
<https://doi.org/10.18772/22013015782.6>
- Fernández, A. L. (2022). Education, the most powerful cultural variable? In *Understanding Cross-Cultural Neuropsychology* (pp. 44–58). Routledge.
<https://doi.org/10.4324/9781003051497-5>
- Ferrett, H. L. (2011). *The adaptation and norming of selected psychometric tests for 12-to 15-year-old urbanized Western Cape adolescents* [Doctoral dissertation, Stellenbosch University]. <http://scholar.sun.ac.za>
- Foxcroft, C. D. (1997). Psychological testing in South Africa: Perspectives regarding ethical and fair practices. *European Journal of Psychological Assessment*, 13(3), 229–235.
<https://doi.org/10.1027/1015-5759.13.3.229>
- Foxcroft, C. D. (2004). Planning a psychological test in the multicultural South African context. *SA Journal of Industrial Psychology*, 30(4), 8–15.
<https://doi.org/10.4102/sajip.v30i4.171>
- Foxcroft, C. D. (2011). Ethical issues related to psychological testing in Africa: What I have learned (so far). *Online Readings in Psychology and Culture*, 2(2), 1–19.
<https://doi.org/10.9707/2307-0919.1022>
- Foxcroft, C. D., Paterson, H., Le Roux, N., & Herbst, D. (2004). *Psychological assessment in South Africa: A needs analysis. The test use patterns and needs of psychological assessment practitioners: Final report. July*. Human Sciences Resource Council.
https://repository.hsrc.ac.za/bitstream/handle/20.500.11910/7498/1716_Foxcroft_Psychologicalassessmentin%20SA.pdf?sequence=1

International Test Commission (ITC). (2018). *ITC guidelines for the large-scale assessment of linguistically and culturally diverse populations*. ITC.

https://www.intestcom.org/files/guideline_diverse_populations.pdf

Jansen, P., & Greenop, K. (2008). Factor analyses of the Kaufman Assessment Battery for Children assessed longitudinally at 5 and 10 years. *South African Journal of Psychology*, 38(2), 355–365. <https://hdl.handle.net/10520/EJC98487>

Jinabhai, C. C., Taylor, M., Rangongo, M. F., Mkhize, N. J., Anderson, S., Pillay, B. J., & Sullivan, K. R. (2004). Investigating the mental abilities of rural Zulu primary school children in South Africa. *Ethnicity and Health*, 9(1), 17–36.

<https://doi.org/10.1080/13557850410001673978>

Kaufman, A. S., & Kaufman, N. L. (2004). *Kaufman Assessment Battery for Children, second edition (KABC-II)*. American Guidance Service.

Kaufman, A. S., & Kaufman, N. L. (2018). *Kaufman Assessment Battery for Children, second edition, normative update (KABC-II NU)* [Measurement instrument]. NCS Pearson.

<https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Cognition-%26-Neuro/Gifted-%26-Talented/Kaufman-Assessment-Battery-for-Children-%7C-Second-Edition-Normative-Update/p/100000088.html?tab=product-details>

Kaufman, A. S., Kaufman, N. L., Drozdick, L. W., & Morrison, J. (2018). *Kaufman Assessment Battery for Children, second edition, normative update, manual supplement*. NCS Pearson.

<https://www.pearsonassessments.com/store/usassessments/en/Store/Professional-Assessments/Cognition-%26-Neuro/Gifted-%26-Talented/Kaufman-Assessment->

[Battery-for-Children-%7C-Second-Edition-Normative-Update/p/100000088.html?tab=product-details](#)

Laher, S., & Cockcroft, K. (Eds.). (2013). *Psychological assessment in South Africa: Research and applications*. Wits University Press.

<https://doi.org/10.18772/22013015782.6>

Laher, S., & Cockcroft, K. (2014). Psychological assessment in post-apartheid South Africa: The way forward. *South African Journal of Psychology*, 44(3), 303–314.

<https://doi.org/10.1177/0081246314533634>

Laher, S., & Cockcroft, K. (2017). Moving from culturally biased to culturally responsive assessment practices in low-resource, multicultural settings. *Professional Psychology: Research and Practice*, 48(2), 115–121. <https://doi.org/10.1037/pro0000102>

Levert, T., & Jansen, P. (2001). A Lurian-Piagetian approach to assessment of historically disadvantaged Black scholars in English medium schools. *South African Journal of Psychology*, 31(4), 21–31. <https://hdl.handle.net/10520/EJC98142>

Lucas, M. (2013). Neuropsychological assessment in South Africa. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 0–28). Wits University Press.

<https://doi.org/10.18772/22013015782.6>

Mawila, D. (2012). *An explorative investigation of the quality of items of the performance scales on the translated Sesotho version of the Junior South African Individual Scales JSAIS (GIQ-8)* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28377534).

Meiring, D. (2007). *Bias and equivalence of psychological measures in South Africa*.

Labyrinth. <https://pure.uvt.nl/ws/portalfiles/portal/819923/202038.pdf>

- Mitchell, J. M., Tomlinson, M., Bland, R. M., Houle, B., Stein, A., & Rochat, T. J. (2018). Confirmatory factor analysis of the Kaufman assessment battery in a sample of primary school-aged children in rural South Africa. *South African Journal of Psychology*, 48(4), 434–452. <https://doi.org/10.1177/0081246317741822>
- Morgan, H. (2022). Conducting a qualitative document analysis. *Qualitative Report*, 27(1), 64–77. <https://doi.org/10.46743/2160-3715/2022.5044>
- Naicker, A. (2013). *An investigation of the quality of the test items on the Numerical scales of the isiZulu translated version of the Junior South African Intelligence Scales (JSAIS) (G-IQ8)* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28376976).
- Nel, N. M., Tlale, L. D. N., Engelbrecht, P., & Nel, M. (2016). Teachers' perceptions of education support structures in the implementation of inclusive education in South Africa. *Koers*, 81(3), 1–14. <https://doi.org/10.19108/KOERS.81.3.2249>
- Nieuwlaat, R., Wiercioch, W., Brozek, J. L., Santesso, N., Kunkle, R., Alonso-Coello, P., Anderson, D. R., Bates, S. M., Dahm, P., Iorio, A., Lim, W., Lyman, G. H., Middeldorp, S., Monagle, P., Mustafa, R. A., Neumann, I., Ortel, T. L., Rochwerg, B., Vesely, S. K., & Schünemann, H. J. (2021). How to write a guideline: A proposal for a manuscript template that supports the creation of trustworthy guidelines. *Blood Advances*, 5(22), 4721–4726. <https://doi.org/10.1182/bloodadvances.2020003577>
- Reid, K. D., Kok, J. C., & Van Der Merwe, M. P. (2002). The PASS model for the assessment of cognitive functioning in South African schools: A first probe. *South African Journal of Education*, 22(3), 246–252. <https://www.ajol.info/index.php/saje/article/view/24877>

- Richardson, W. S., Wilson, M. C., Nishikawa, J., & Hayward, R. S. A. (1995). The well-built clinical question: A key to evidence-based decisions. *ACP Journal Club*, 123(3), A12-3. <https://doi.org/10.7326/ACPJC-1995-123-3-A12>
- Servaes, S., Choudhury, P., & Parikh, A. K. (2022). What is diversity? *Pediatric Radiology*, 52(9), 1708–1710. <https://doi.org/10.1007/s00247-022-05356-0>
- Shuttleworth-Edwards, A. B. (2016). Generally representative is representative of none: Commentary on the pitfalls of IQ test standardization in multicultural settings. *Clinical Neuropsychologist*, 30(7), 975–998. <https://doi.org/10.1080/13854046.2016.1204011>
- Shuttleworth-Edwards, A. B. (2023). Cognitive test norms within multicultural, multiracial, multilingual, multi-opportunity South Africa: Clinical neuropsychological assessment and diagnosis. In G. J. Boyle, Y. Stern, D. J. Stein, B. J. Sahakia, C. J. Golden, T. M.-C. Lee, & S.-H. A. Chen (Eds.), *The SAGE Handbook of clinical neuropsychology: Clinical neuropsychology* (1st ed., pp. 94–107). SAGE. <https://doi.org/10.4135/9781529789539>
- Shuttleworth-Edwards, A. B., & Truter, S. (2023). *Cross-cultural cognitive test norms: An advanced collation from Africa*. Inter-Ed Publishers. <https://www.inter-ed.co.za/cross-cultural-cognitive-test-norms-an-advanced-collation-from-africa/>
- Shuttleworth-Edwards, A. B., Van der Merwe, A. S., Van Tonder, P., & Radloff, S. E. (2013). WISC-IV test performance in the South African context: A collation of cross-cultural norms. In *Psychological Assessment in South Africa: Research and applications* (1st ed., pp. 33–47). Wits University Press. <https://doi.org/10.18772/22013015782.8>

- Sidanius, J., Brubacher, M., & Silinda, F. (2019). Ethnic and national attachment in the rainbow nation: The case of the Republic of South Africa. *Journal of Cross-Cultural Psychology*, 50(2), 254–267. <https://doi.org/10.1177/0022022118814679>
- Simpson-Kent, I. L., Fuhrmann, D., Bathelt, J., Achterberg, J., Borgeest, G. S., & Kievit, R. A. (2020). Neurocognitive reorganization between crystallized intelligence, fluid intelligence and white matter microstructure in two age-heterogeneous developmental cohorts. *Developmental Cognitive Neuroscience*, 41(100743), 1-15. <https://doi.org/10.1016/j.dcn.2019.100743>
- Stone, C. M. (2021). *Psychological construct validity* [Doctoral dissertation, Washington University in St. Louis]. https://openscholarship.wustl.edu/art_sci_etds
- Swart, E., & Pettipher, R. (2005). A framework for understanding inclusion. In E. Landsberg, D. Kruger, & N. Nel (Eds.), *Addressing barriers to learning* (1st ed., pp. 3–23). Van Schaick Publishers.
- Te Nijenhuis, J., Murphy, R., & van Eeden, R. (2011). The Flynn effect in South Africa. *Intelligence*, 39(6), 456–467. <https://doi.org/10.1016/j.intell.2011.08.003>
- Teixeira, L. C. (2011). *A Rasch Model Analysis of Responses of isiZulu-speaking grade one learners to items on the Verbal Intelligence Quotient Eight (VIQ 8) Scale of an isiZulu translation of the Junior South African Individual Scales (JSAIS)* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28325704).
- Van der Merwe, I., De Klerk, W., & Erasmus, P. (2022). Intelligence Instruments Applied to South African school learners: A critical review. *Frontiers in Psychology*, 13(853239), 1–11. <https://doi.org/10.3389/fpsyg.2022.853239>
- Van der Merwe, I., De Klerk, W., & Erasmus, P. (2023). *Exploring the experiences of intelligence test development/adaptation experts as well as South African*

- psychologists and psychometrists who have administered intelligence instruments to South African school learners in various contexts* [Manuscript submitted for publication]. School of Psychosocial Health, North-West University.
- Van Wyhe, K. (2012). *Wechsler Abbreviated Scale of Intelligence: Preliminary normative data for 12-15-year-old English- and Afrikaans-speaking Coloured learners in the Western Cape* [Master's dissertation, University of Cape Town].
<http://hdl.handle.net/11427/12057>
- Velarde, J. M., Ghani, M. F., Adams, D., & Cheah, J.-H. (2022). Towards a healthy school climate: The mediating effect of transformational leadership on cultural intelligence and organisational health. *Educational Management Administration & Leadership*, 50(1), 163–184. <https://doi.org/10.1177/1741143220937311>
- Wechsler, D. (2014). *Wechsler intelligence scale for children-5th ed. (WISC-V)*. NCS Pearson.
- World Health Organization (WHO). (2014). *WHO handbook for guideline development*. (2nd ed.). WHO Press. <https://www.who.int/publications/i/item/9789241548960>

SECTION 3: RESEARCHER CRITICAL REFLECTION AND RECOMMENDATIONS

Introduction

The researcher kept a journal throughout the PhD research study process in which her personal reflections were captured. This critical reflection is described here in Section 3. It is applicable to the process which led to initiate this research study as well as the three phases of the PhD research study.

Application Process

As an Educational Psychologist, with considerable experience in administering intelligence tests to South African school learners, I came to realise the limitations and challenges which outdated, out-normed, and cross-culturally unfair intelligence tests bring to all parties involved. At times, I faced the predicament of either assessing children, using cross-culturally unfair tests, or not assessing them at all; both scenarios carried elements of discriminatory and unfair practice, which placed a large burden on me as a practitioner. I am obligated and determined to always act ethically and professionally. These concerns were confirmed and amplified during informal discussions with other South African colleagues and practitioners in the field of psychometrics. Hence, I chose to do my part and pursue research studies that could foster positive transformations in the domain of intellectual assessments by facing the challenge of advancing intelligence measurements to be more applicable and appropriate to South African school learners.

Phase 1: Critical Review

As the Phase 1 segment of the research study did not involve human subjects but only concentrated on a literature review, I was able to start right away. My background experience includes working at various schools (i.e. private, mainstream, and special education) where school learners varied in ethnicity (i.e. multilingual and multicultural) and contextual

background (i.e. socio-economic status and quality of education). I provided guidance and support to school learners with various learning difficulties, disabilities, or other challenges. I also worked at hospitals (consultation of patients with emotional, physical, and other medical trauma and/or challenges) and in private practice (consultation of clients with educational, medical/physical, and psychological trauma and/or challenges). As I was reviewing the literature, I knew that my background and experience would affect the lens through which I viewed the sources and impact my interpretations and judgment of the data; however, I also realised that hands-on experience provided depth and insight to the processes followed in Phase 1, and the rest of this PhD research study.

Working and living in South Africa (ZA), a rich multi-ethnic and multi-lingual country, brings both rewards and challenges. Adhering to Positive Psychology practices, I understand when using clinical measuring instruments such as an intelligence test, it is imperative to ensure that the instrument is culturally and linguistically fair, as well as normed and tailored to fit the present, South African population. When assessing school learners with the Senior South African Individual Scale – Revised (SSAIS-R) for instance, there have been multiple incidences where the learners could not answer the question appropriately because they were unfamiliar with the test content. Examples include outdated pictures, scenarios, or terms used (e.g. when asked to identifying missing information on a letter envelope to be posted/mailed); scenarios that are not necessarily part of their physical frame of reference (e.g. a train station); not understanding the question properly because they were tested in a second or third language; or scenarios that are different to their socio-cultural frame of reference (e.g. a question asking why one would give money to a welfare organisation instead of a street beggar). The last example question has elicited various answers, depending on the school learners' contextual background. As the assessor, I was placed in the unfortunate position to mark certain answers wrong, like when school learners answered that one should

definitely give the beggar the money (not the welfare organisation), because they have family members who worked as beggars. Determining the correct answer to this question is dependent on who the authors are and what their backgrounds entail. In these instances, when school learners lost marks due to unfair questions or test content, the scores derived were invalid and unfair. Intelligence tests are supposed to guide and support the process of making important, informed decisions and developing functional Individual Education Plans (IEPs) for the school learners who face learning barriers (Cavendish & Connor, 2018) and other relevant challenges such as emotional, social, physical, medical, contextual difficulties (i.e. lower socio-economic status, crime or violence, and domestic challenges such as having limited water, food, and electricity, family members facing or dying from life threatening illnesses, or children either not having guardians or acting as guardians to their siblings and other younger family members). In these and many other examples, the intelligence instruments have failed in their intended role of providing information on school learners' abilities for important decisions that would serve to the benefit of the school learners.

Kaufman (2009, p. 5) explained that valid, reliable individually administered intelligence tests (such as the Wechsler's tests, Stanford-Binet, Kaufman tests, Woodcock-Johnson tests and "a handful of others") are designed "for the clinical evaluation of children, adolescents, or adults who are referred for diverse reasons, such as possible brain damage, emotional disturbance, giftedness, or learning disabilities". These individually administered "clinical assessments" are employed "to help make real-life decisions" (Kaufman, 2009, p. 5). This recognises valid and reliable individual intelligence tests as vital and necessary tools in the field of psychometric testing.

Due to factors such as the Flynn effect, which is the constant increase of IQ scores over time (Platt et al., 2019; Te Nijenhuis et al., 2011), as well as new research findings, Kaufman (2009) suggests it imperative to continually revise and standardise intelligence

measurements in a timely fashion, to prevent testing with outdated norms and content. The Flynn effect is a phenomenon that describes the consistent rise in IQ scores over the past century due to changing trends in overall environmental and societal complexity; this includes environmental factors such as better nutrition, higher quality of education and life, optimal prenatal and post-natal care, and reduced exposure to toxins (Kaufman, 2009; Platt et al., 2019). Kaufman's previous suggestion is confirmed by the International Test Commission's (ITC, 2015) provided guidelines on keeping test norms recent, sufficient, fair, culturally relevant and represent the population's characteristics.

With the role change in the Human Sciences Resource Council (HSRC), local intelligences tests such as the SSAIS-R and the Junior South African Individual Scales (JSAIS) have never been revised and became outdated (Lucas, 2013). The SSAIS-R and JSAIS are intelligence tests that are widely used in South Africa, but these tests and their norms have not been updated since their inception, making them outdated and inapplicable to South African school learners (Cockcroft, 2013). International intelligence tests, such as the Wechsler Intelligence Scales, are also commonly used in South Africa, but their applicability to South African learners is still in question, and it is unclear if their adapted norms are representative of all South Africans (Shuttleworth-Edwards et al., 2013).

Research studies such as those conducted by the post-graduate students at the University of Johannesburg who evaluated the JSAIS tests (see Blake, 2011; Mawila, 2012; Naicker, 2013; Naicker, 2013; Teixeira, 2011) or other research studies (such as Baddeley, 2012; Foxcroft et al., 2004; Laher & Cockcroft, 2017; Shuttleworth-Edwards, 2016, 2017), mention and thus amplify the need for locally designed intelligence instruments that are applicable, valid and fair to South African school learners. Hence, concurring the problem statement and aim of this PhD research study.

Phase 2: Semi-Structured Interviews with Psychologists/Psychometrists and Experts in Intelligence Test Development/Adaptation

It was apparent how passionate and enthusiastic participants were when discussing the topic at hand; they encouraged me to continue the research. Some were sceptical, but most were enthusiastic and even excited about the research.

I found it more challenging to code the interviews of the professors, as their feedback contained a lot of long, detailed answers, some even quotes out of literature, and covering various topics that have importance and which held some or other relevance to the research aim.

While coding, many codes initially seemed to have had indirect relevance to the research aim, but repeated. Later on, other codes acted as bridges to connect codes to become part of the themes – move from indirect to direct influence.

The assessors asking additional questions to clients before assessment (e.g. did they eat, travel far, sleep sufficiently, or experience stressors from violent or traumatic environments) highlighted the importance of knowing the client within their contexts and providing sufficient support, within reason, to ensure each child the optimal chance to perform to the best of their ability.

What stood out to me was the importance of the way in which the assessors conducted themselves before, during and after testing. Conduct is as important, or perhaps even more important than merely following the basic/conventional steps of test administration.

Moreover, working with school learners, one is also indirectly working with their guardians, parents, teachers, and other relevant parties who are held responsible for their safety and well-being. Working with these stakeholders will help enhance progress and serve to inform the practitioner of essential influencing elements.

Mention was made of the multidiverse teams not being able to really create African-centred test instruments and merely resorting to rehashing past, negative experiences.

Considering this incident from a framework of a therapist, trained in trauma, I've witnessed how traumatic events could place a person in a position where they become "stuck" in the negative experiences (remaining in a sympathetic stance, see Polyvagal theory) which keeps them from moving forward or engaging in creative thinking (allowed and possible through the parasympathetic nervous system).

Finally, I became aware of a theme which seemed common to most of the participant comments, namely, the way the school learners were assessed, which is more than the assessment itself. How the assessors approached and responded to the learners, seemed to make the difference. Insight in the way of assessing learners was built through having knowledge on the learners and their backgrounds. This additionally brings light to interpreting their scores appropriately from which suitable interventions and diagnoses can be drawn.

Phase 3: Developing the Strategic Guideline to Design an Intelligence Instrument Applicable to South African School Learners

Phase 3 was quite an extraordinary experience, as everything seemed to amalgamate in this part of the PhD research study. In developing the strategic guideline, the aim was to provide appropriate and suitable suggestions to intelligence test developers in order to design instruments that are applicable to the South African school learners. Despite initial doubts from a few participants, the guideline was successfully implemented, thanks to the procedures provided and followed in this PhD research study. By drawing on the insights gained from both literature in Document 1 and participant experiences in Document 2, a strategic guideline was developed that transformed what seemed impossible into a reality. I structured the guideline as a series of steps to be followed, making it easier for others to apply

it to their practices and transfer the knowledge gained. The strategic guideline can be applied not only to school learners in the South African contexts, but also to other contexts where experts in intelligence test development need to design and cater for persons with multidiversity in their ethnicity and contextual backgrounds.

Although challenging, attempting to conduct valid and reliable intelligence assessments in the unique, multidiverse South African context, could serve as opportunity to improve intelligence measuring instruments to be more cross-culturally fair and applicable to South African school learners. Cross-cultural appropriateness and suitability of intelligence instruments could be extended globally. Using the analogy of a knife as a medical instrument, when applied appropriately, the intelligence assessment is an effective tool, although it can be destructive when abused - like the knife. While it is important to ensure that the intelligence measuring instrument is valid, reliable, and ideally designed, equal attention should be paid to the application and use of the measurement. It is recommended that a constructive, user-friendly manual should accompany the intelligence instrument, with a detailed description of topics such as the instrument purpose, possible risks and pitfalls, safety measures, client and context limitations, scope of practice, preparation steps, as well as manner of applying the test instrument. Case study examples could further allow for transferability and better understanding. A comprehensive manual can help ensure that the intelligence instrument is used appropriately and effectively, and can provide guidance on how to interpret the results and make appropriate interventions.

Conclusion and Recommendations

Findings from this PhD research study provided significant evidence of invalid and unreliable intelligence assessment practices of applying inapplicable, outdated, and cross-culturally unfair intelligence measuring instruments to South African school learners.

Practitioners are required by law and professional ethics to conduct intellectual assessment

practices that are fair and unbiased for all. This is a challenging task, as South African school learners come from diverse cultural, linguistic, and socio-economic backgrounds, and have varying levels of educational attainment. These demographics are also constantly changing, with continuous acculturation taking place. Above-mentioned suggests an urgent need for emic and suitable intelligence measurements and practices. This PhD research study developed a strategic guideline that can be used by experts who intend to design suitable intelligence measuring instruments to be appropriately applied to South African, multi-ethnic, and multi-contextual school learners. The use of culturally sensitive and appropriate intelligence measurements and practices can help ensure that the intelligence assessments are valid, reliable, and fair, and can provide valuable insights into the context and factors that influence the outcome. Appropriate diagnoses and interventions can be made based on true test performance and results of the South African school learners.

It is recommended that the strategic guideline, developed in this PhD research study for designing intelligence instruments suitable for South African school learners, be applied by experts who intend to design or adapt such instruments. The application of this guideline could be extended to other populations and types of assessment measurements and their application, specifically when conducted on a population group that varies in ethnicity, culture, language, and contextual background. It is important to keep in mind that intelligence instruments have their limitations and could only be used for the intent/purpose of their design. These instruments should be applied with caution and care, continuously keeping the assessee's best interests in mind. The experts who design or adapt intelligence instruments, should preferably be a multidimensional team which represents all, or at least most of the demographical characteristics found in ZA. When applying the newly designed or adapted tests, collaborative inputs from the assessee (e.g. questions before and after assessment on testing experiences and thinking processes [metacognition]) and their communities should

render beneficial and additionally demonstrate the well-known South African term of “ubuntu”. Finally, it should be noted that when administering intelligence assessments to learners, that it be fair and constructive. If the instrument content, manner of questioning, and/or application of results cause any form of discrimination or hindrance to the learner, it should not be administered. This suggests a thorough background history be taken combined with a suitable screening process conducted prior to testing, to ensure that the instrument applied is an appropriate fit and would do no harm.

Qualitative studies typically have small sample sizes, which allow researchers to conduct more in-depth and thoughtful analyses of their data (Thorne, 2016). The insights gained from shared experiences of psychometric practitioners proved valuable in this study. Future researchers could consider conducting a similar study with a larger sample size of professionals in the field. Additionally, gathering data from school learners, parents, and educators regarding intelligence testing could provide further valuable information. This PhD research study focused on South African school learners, but future research could expand its focus to other population groups.

The strategic guideline developed in this PhD research study for designing intelligence instruments suitable for South African school learners emphasises the importance of fair assessment measurements and practices that can promote multi-ethnic equalisation and empowerment of both school learners and practitioners.

References

- Baddeley, A. (2012). Working Memory: Theories, models, and controversies. *Annual Review of Psychology*, 63(1), 1–29. <https://doi.org/10.1146/annurev-psych-120710-100422>
- Blake, B. M. (2011). *A Rasch Model Analysis of the Items on the VIQ8 Scale of a Sesotho Translated Version of the JSAIS* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28376972).
- Cavendish, W., & Connor, D. (2018). Toward authentic IEPs and transition plans: Student, parent, and teacher perspectives. *Learning Disability Quarterly*, 41(1), 32–43. <https://doi.org/10.1177/0731948716684680>
- Cockcroft, K. (2013). The Senior South African Individual Scales - Revised. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 48–59). Wits University Press. <https://doi.org/10.18772/22013015782.9>
- Foxcroft, C. D., Paterson, H., Le Roux, N., & Herbst, D. (2004). *Psychological assessment in South Africa: A needs analysis. The test use patterns and needs of psychological assessment practitioners: Final report. July*. Human Sciences Resource Council. https://repository.hsrc.ac.za/bitstream/handle/20.500.11910/7498/1716_Foxcroft_Psychologicalassessmentin%20SA.pdf?sequence=1
- International Test Commission (ITC). (2015). *International guidelines for practitioner use of test revisions, obsolete tests, and test disposal*. ITC. https://www.intestcom.org/files/guideline_test_disposal.pdf
- Kaufman, A. S. (2009). *IQ testing 101*. Springer Publishing Company. <https://doi.org/10.1891/9780826129536>

- Laher, S., & Cockcroft, K. (2017). Moving from culturally biased to culturally responsive assessment practices in low-resource, multicultural settings. *Professional Psychology: Research and Practice*, 48(2), 115–121. <https://doi.org/10.1037/pro0000102>
- Lucas, M. (2013). Neuropsychological assessment in South Africa. In S. Laher & K. Cockcroft (Eds.), *Psychological Assessment in South Africa Book. Research and applications* (1st ed., pp. 0–28). Wits University Press. <https://doi.org/10.18772/22013015782.6>
- Mawila, D. (2012). *An explorative investigation of the quality of items of the performance scales on the translated Sesotho version of the Junior South African Individual Scales JSAIS (GIQ-8)* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28377534).
- Naicker, A. (2013). *An investigation of the quality of the test items on the Numerical scales of the isiZulu translated version of the Junior South African Intelligence Scales (JSAIS) (G-IQ8)* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28376976).
- Platt, J. M., Keyes, K. M., McLaughlin, K. A., & Kaufman, A. S. (2019). The Flynn effect for fluid IQ may not generalize to all ages or ability levels: A population-based study of 10,000 US adolescents. *Intelligence*, 77(September), 101385. <https://doi.org/10.1016/j.intell.2019.101385>
- Shuttleworth-Edwards, A. B. (2016). Generally representative is representative of none: commentary on the pitfalls of IQ test standardization in multicultural settings. *Clinical Neuropsychologist*, 30(7), 975–998. <https://doi.org/10.1080/13854046.2016.1204011>

- Shuttleworth-Edwards, A. B. (2017). Countrywide norms declared obsolete: Best practice alert for IQ testing in a multicultural context. *South African Journal of Psychology*, 47(1), 3–6. <https://doi.org/10.1177/0081246316684465>
- Shuttleworth-Edwards, A. B., Van der Merwe, A. S., Van Tonder, P., & Radloff, S. E. (2013). WISC-IV test performance in the South African context: A collation of cross-cultural norms. In S. Laher & K. Cockcroft (Eds.), *Psychological assessment in South Africa: Research and applications* (1st ed., pp. 33–47). Wits University Press. <https://doi.org/10.18772/22013015782.8>
- Te Nijenhuis, J., Murphy, R., & van Eeden, R. (2011). The Flynn effect in South Africa. *Intelligence*, 39(6), 456–467. <https://doi.org/10.1016/j.intell.2011.08.003>
- Teixeira, L. C. (2011). *A Rasch Model Analysis of Responses of isiZulu-speaking grade one learners to items on the Verbal Intelligence Quotient Eight (VIQ 8) Scale of an isiZulu translation of the Junior South African Individual Scales (JSAIS)* [Magister minor dissertation, University of Johannesburg]. Available from ProQuest Dissertations and Theses database. (ProQuest document ID 28325704).
- Thorne, S. (2016). *Interpretive description: Qualitative research for applied practice* (2nd. Ed.). Routledge.

SECTION 4: RELEVANT APPROVAL LETTERS

Addendum A: Approval Letters from HREC



Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 086 016 9698
Web: <http://www.nwu.ac.za/>

North-West University Health Research Ethics
Committee (NWU-HREC)

Tel: 018 299-1206
Email: Ethics-HRECApolw@nwu.ac.za (for human
studies)

18 August 2021

ETHICS APPROVAL LETTER OF STUDY

Based on approval by the North-West University Health Research Ethics Committee (NWU-HREC) on 18/08/2021, the NWU-HREC hereby approves your study as indicated below. This implies that the NWU-HREC grants its permission that, provided the general conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

Study title: Development of a strategic guideline to design an intelligence instrument applicable to South African school learners: A multi-method exploration																														
Principal Investigator/Study Supervisor/Researcher: Dr CP Erasmus																														
Student: I van der Merwe - 11313749																														
Ethics number:	<table border="1"><tr><td>N</td><td>W</td><td>U</td><td>-</td><td>0</td><td>0</td><td>1</td><td>9</td><td>1</td><td>-</td><td>2</td><td>1</td><td>-</td><td>A</td><td>1</td></tr><tr><td colspan="3">Institution</td><td colspan="3">Study Number</td><td colspan="3">Year</td><td colspan="3">Status</td></tr></table>			N	W	U	-	0	0	1	9	1	-	2	1	-	A	1	Institution			Study Number			Year			Status		
N	W	U	-	0	0	1	9	1	-	2	1	-	A	1																
Institution			Study Number			Year			Status																					
Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation																														
Application Type: Single study																														
Commencement date: 18/08/2021		Risk:	<table border="1"><tr><td>Minimal</td></tr></table>	Minimal																										
Minimal																														
Expiry date: 31/08/2022																														
Approval of the study is provided for a year, after which continuation of the study is dependent on receipt and review of an annual monitoring report and the concomitant issuing of a letter of continuation. A monitoring report is due at the end of August annually until completion.																														

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- The principal investigator/study supervisor/researcher must report in the prescribed format to the NWU-HREC:
 - Annually on the monitoring of the study, whereby a letter of continuation will be provided annually, and upon completion of the study; and
 - without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.
- The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the principal investigator/study supervisor/researcher must apply for approval of these amendments at the NWU-HREC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.
- Annually a number of studies may be randomly selected for active monitoring.
 - indicates the first date that the study may be started.
 - cal responsibility, the NWU-HREC reserves the right to:
 - request access to any information or data at any time during the course or after completion of the study;
 - to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;

- *withdraw or postpone approval if:*
 - *any unethical principles or practices of the study are revealed or suspected;*
 - *it becomes apparent that any relevant information was withheld from the NWU-HREC or that information has been false or misrepresented;*
 - *submission of the annual monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and/or*
 - *new institutional rules, national legislation or international conventions deem it necessary.*
- NWU-HREC can be contacted for further information via Ethics-HRECApply@nwu.ac.za or 018 299 1206

Special conditions of the research approval due to the COVID-19 pandemic:

Please note: Due to the nature of the study i.e. (online collection of quantitative and qualitative data from psychometrists and psychologists), this study will be able to proceed during the current alert level, following receipt of the approval letter. No additional COVID-19 restrictions have been placed on the study except that the researcher must ensure that before proceeding with the study that all research team members have reviewed the North-West University COVID-19 Occupational Health and Safety Standard Operating Procedure.

The NWU-HREC would like to remain at your service and wishes you well with your study. Please do not hesitate to contact the NWU-HREC for any further enquiries or requests for assistance.

Yours sincerely,

 Digitally signed by
Prof Petra Bester
Date: 2021.08.19
11:54:09 +02'00'

Chairperson NWU-HREC

Current details: (23239522) G:\My Drive\9. Research and Postgraduate Education\9.1.5.4 Templates\9.1.5.4.2_NWU-HREC_EAL.docx
20 August 2019
File Reference: 9.1.5.4.2

Addendum B: Turnitin Certificate

26159600:4._Ilze_Van_der_Merwe_11313749_-
_Turnitin_Report_-_23.11.2023.pdf

ORIGINALITY REPORT

7%

SIMILARITY INDEX

6%

INTERNET SOURCES

5%

PUBLICATIONS

2%

STUDENT PAPERS

PRIMARY SOURCES

Addendum C: Goodwill Permission Letters from Gatekeepers



14 June 2021

Dear Ilze

PERMISSION LETTER

We at SACNA appreciate the important research that you are doing that we hope that it will ultimately improve the quality of IQ testing in our diverse South African context.

We hereby confirm that we will send out an e-mail informing our members of your research, and to encourage them to participate as part of the recruitment process for your PhD study

Kind regards

Sharon Truter
President



140 Gordon Road
Colbyn
Pretoria
0083
South Africa
16 June 2021

Dear Ilze

PERMISSION LETTER

We appreciate the invaluable research that you are doing and believe that it will improve the quality of IQ testing in South Africa.

We hereby confirm that we will send out an e-mail informing our clients of your research, and to encourage them to participate as part of the recruitment process for your PhD study.

Kindest regards,

A handwritten signature in black ink, appearing to read "F. Kriek".

Frikkie Kriek
Consultant Psychologist
Mindmuzik Media

14 June 2021

Dear Ilze

This is to confirm that we will send out an e-mail informing our NeuropsychologySA members of your research, and to encourage them to participate as part of the recruitment process for your PhD study

Kind regards

Sharon Truter



SOCIETY FOR
EDUCATIONAL PSYCHOLOGY OF
SOUTH AFRICA

June 18th, 2021

Mrs Ilze van der Merwe

Re: Doctoral study: Development of a strategic guideline to design an intelligence instrument applicable to South African school learners: A multi-method exploration

SEPSA hereby consents to serving as a mediator in sending out invitations to registered psychologists on our client list, inviting them to participate in the research study.

Kind regards,

Dr. Diana Soares De Sousa

SEPSA Co-Chair

diana@sacap.co.za

Mrs. Lize Bouwer

SEPSA Co-Chair

lizebouwer@yahoo.com

Mrs. Momi Metsing

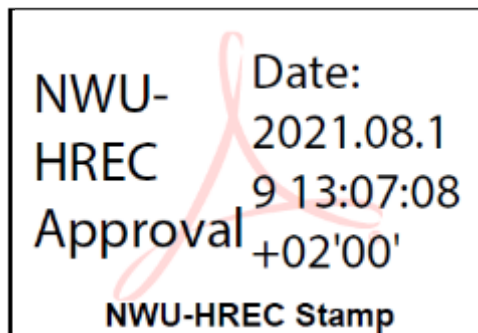
SEPSA Secretary

momzeneiro@gmail.com

Addendum D: Informed Consent Form to Participants



Private Bag X2046, Mmabatho
South Africa 2745
Tel: +2718 299-1111/2222
Fax: +2718 299-4910
Web: <http://www.nwu.ac.za>



INFORMED CONSENT DOCUMENTATION FOR EXPERTS IN INTELLIGENCE TEST DEVELOPMENT OR ADAPTATION AS WELL AS PSYCHOLOGISTS AND PSYCHOMETRISTS WHO HAVE CONDUCTED INTELLIGENCE ASSESSMENTS ON SOUTH AFRICAN SCHOOL LEARNERS WITHIN VARIOUS CONTEXTS

TITLE OF THE RESEARCH STUDY: Exploring the experiences of intelligence test development/adaptation experts and psychologists/psychometrists who have administered intelligence instruments to South African school learners in various contexts.

ETHICS REFERENCE NUMBERS: NWU-00191-21-A1

PRINCIPAL INVESTIGATOR: Dr Petro Erasmus (Project Head and PhD Promoter: Registered Educational Psychologist)

CO-PROMOTOR: Prof Werner de Klerk (Associate Professor and PhD Co-promotor: Registered Research Psychologist)

POST GRADUATE STUDENT: Mrs Ilze van der Merwe (PhD Psychology)

ADDRESS: North-West University
Faculty of Health Sciences
School of Psychosocial Health
Private bag X2046
Box 575
Mmabatho
2745

CONTACT NUMBER: +2782 780 6139 (cell.)/+2718 389 2386(office)

You are being invited to take part in a research study that forms part of my (Ilze van der Merwe) Doctoral studies in Psychology. Please take some time to read the information presented here, which will explain the details of this study. Please ask the researcher or person explaining the research to you any questions about any part of this study that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how you might be involved. Also, your participation is entirely voluntary, and you will have the option to freely decline participation, which will not affect you negatively in any way whatsoever. If you do choose to participate, you will be free to withdraw from the study at any point (prior data analysis).

This research study has been approved by the NWU-Health Research Ethics Committee of the Faculty of Health Sciences of the North-West University (NWU-00191-21-A1) and will be conducted according to the ethical guidelines and principles of Ethics in Health Research: Principles, Processes and Structures (DoH, 2015) and other international ethical guidelines applicable to this study. It might be necessary for the research ethics committee members or other relevant people to inspect the research records.

What is this research study all about?

- *We plan to explore the experiences of experts in intelligence test development or adaptation, as well as the experiences of psychologists and psychometrists who have administered intellectual assessments to South African school learners in various contexts. These findings will possibly provide enriching data regarding the design of an intelligence instrument that could be applicable to South African school learners.*
- *This research study will involve the researcher (Mrs Ilze van der Merwe) conducting individual, semi-structured interviews with experts in intelligence test development/adaptation or psychologists/psychometrists who have administered intelligence instruments to South African school learners. Interviews will be conducted by means of internet-based technologies such as Zoom or Skype. The researcher conducting the interviews is an experienced interviewer and registered at the Health Professions Council of South Africa (HPCSA) as Educational Psychologist.*

Why have you been invited to participate?

- *You have been invited to be part of this research because you are either an expert in intelligence test development/adaptation, or a psychologist/psychometrist registered at the HPCSA, who could provide valuable information regarding your own experience in intelligence test development/adaptation or administering intelligence instruments to South African school learners in various contexts.*
- *You also fit the research because you are willing to participate in the research, willing to sign informed consent and willing to be interviewed and recorded while being interviewed online.*
- *You are also able to participate because you, as psychologist/psychometrist have efficient experience in administering intelligence instruments to school learners in various contexts in South Africa, or you as expert in intelligence test development/adaptation have adapted or developed at least one intelligence test.*
- *You will unfortunately not be able to take part in this research if you are not an expert in intelligence test development/adaptation or a psychologist/psychometrist registered at the HPCSA. You will also be excluded if you have not either developed/adapted an intelligence test or administered intelligence instruments to South African school learners. If you share a personal or power relationship with the researcher, you will be excluded from participating in this research study.*

What will be expected of you?

- *You will be expected to participate in an individual, semi-structured, internet-based interview where you will be required to share your experiences regarding intelligence test development/adaptation or experiences administering an intelligence instrument to South African school learners within the various contexts. The interview will be scheduled at a time and date that suits you and the researcher (Ilze van der Merwe) and will take approximately 30-60 minutes.*
- *A research psychology intern within the School of Psychosocial Health (who have received the Basics of Health Research Ethics Training), will act as independent intermediary (gatekeeper) between you and the researcher (Ilze van der Merwe).*
- *The independent person will inform you of the research study and email you the informed consent form, at least 2 weeks prior to the interview, to ensure sufficient time for you to make an informed decision and for all parties (participant and independent person) to finalise the signing of the informed consent forms.*

- The independent person will set up an online appointment for the signing of the informed consent document, during which you will also be granted the opportunity to discuss any concerns or questions you might have regarding the interview process. Both the independent person and you as participant will have to arrange to have a person present who can co-sign the informed consent document and witness the signing process. Four people will therefore be present while signing the informed consent document from two different places: you as participant, independent person, and two witnesses on each side. You will then be asked to scan and email, or alternatively take a photograph of the signed document and send it via WhatsApp to the independent person.
- Once all the consent forms have been provided to the researcher (Ilze van der Merwe), will she then make contact with you to decide on a date and time to conduct the interview.
- During your online interview, the researcher will arrange to be in a separate room, ensuring privacy, and tactfully request the same from you, the interviewee, to provide you with the opportunity to share your experiences in a free and private manner.
- After your permission, you will again be informed that the interview sessions will be recorded and transcribed verbatim with the purpose to prevent any assumptions on the researchers' part.
- Dr Petro Erasmus and Prof Werner de Klerk will act as the PhD promoters for Mrs Ilze van der Merwe's research thesis and will oversee the whole research project to ensure that all ethical aspects are adhered to and that the independent person and researcher act accordingly regarding their research roles as specified. They will also provide monitoring reports to the HREC regarding the progress of this research study.

Will you gain anything from taking part in this research?

- There are no direct benefits foreseen in this research study. However, the following indirect benefits are foreseen:
 1. The research study will allow you to voice your concerns and provide inputs that could enhance your professional field of Psychology.
 2. Providing inputs could help develop a strategic guideline to design an intelligence instrument that should be more applicable to all South African school learners within various contexts. This allows fair, democratic, and unbiased psychological practices that is expected and promoted by the constitution of RSA. In addition, South African psychological assessment practices is still, at times, perceived as a field of discriminating and segregated practices, as was done during the apartheid era. By administering ethnically appropriate intelligence instruments, could enhanced the view and restore faith of Psychology as a field.
 3. Designing an intelligence instrument applicable to all South African school learners, could empower South African school learners with a fair chance to perform scholastically by psychologists/ psychometrists providing them with applicable and fair findings and recommendations.

Are there risks involved in you taking part in this research and what will be done to prevent them?

- The risks to you in this research study are low, as you will share your professional experiences and not your personal experiences. No physical risks are evident. The interview will occur in a private, safe room, and otherwise in the comfort of your own chosen, familiar environment, reducing the chances towards risk.
- The internet-based interview could bring you discomfort due to the technical element and/or technical difficulties that could arise during the interview. The researcher, as interviewer, will attempt at best to overcome these potential difficulties with professionalism as well as empathetic listening and invitational language skills.
- If the aspects discussed in the interview leaves you feeling upset during or after the interview, the interviewer will contain the situation (during the interview) and debriefing sessions, conducted by a registered Clinical Psychologist (functioning independently to this research study) will be made available to you after the interview.
- There are more gains for you in joining this research study than there are risks.

How will we protect your confidentiality and who will see your findings?

- Anonymity of your findings will be protected by allocating numbers to participants as well as by coding the data during transcription. This will ensure that no link can be made to a specific participant. Findings will be kept confidential by the way the data will be captured - by changing identifying data during the transcription phase.

- All recordings of internet-based interviews will be copied (transferred) and saved only on the password protected computers of the researcher and her PhD promoters. Only these three copies will exist. After this, the recordings will be transcribed and all identifying data will be changed by giving each participant a participant number.
- Reporting of findings will be anonymous. Only the researcher (Ilze van der Merwe) and her PhD promoters (Dr Petro Erasmus and Prof Werner de Klerk) will have access to the data and will be able to look at your findings. Data will be kept safe by locking hard copies in locked cupboards in the researcher's office, and electronic data (recordings and transcripts) will be password protected.
- Data will be stored for seven years at the North-West University (within COMPRES [Community Psychosocial Research]), after which it will be destroyed by the North-West University.
- The HREC will be monitoring the research process to ensure that all aspects regarding this research project that has been approved is adhered to.

What will happen with the findings or samples?

- This is a once off collection and data will be analysed in South Africa. After data analysis is completed, an article will be written reporting the findings and conclusions and it will then be submitted for possible publication in an accredited scientific journal. Please take note that findings of this research (phase 2) will also be reported in the Doctoral Thesis of the researcher (Ilze van der Merwe) as part of obtaining her PhD Degree in Psychology at the North-West University. This research data (phase 2) will be used to assist with the development of a strategic guideline to design an intelligence instrument applicable to South African school learners (phase 3).

How will you know about the findings of this research study?

- If requested, we will send you the findings of this research (a copy of the thesis) electronically, after the data analysis has been completed and a thesis has been compiled. If the submission of an article for possible publication is successful, findings of the research study will also be available when it gets published.
- You will be informed of any new relevant findings by means of email.

Will you be paid to take part in this research study and are there any costs for you?

This research study is funded by the researcher (Ilze van der Merwe). Yes, you will receive R200 compensation for any financial charge of downloading and using Skype, Zoom, or other internet-based communication during the semi-structured interview. There will thus be no costs involved for you if you do take part in this study.

Is there anything else that you should know or do?

- You can contact Ilze van der Merwe at +2782 921 1906 if you have any further questions or have any problems.
- You can also contact the NWU-Health Research Ethics Committee via Mrs Carolien van Zyl at 018 299 1206 or carolien.vanzyl@nwu.ac.za if you have any concerns that were not answered about the research or if you have complaints about the research.
- You will receive a copy of this information and consent form for your own purposes.

Declaration by participant

By signing below, I, agree to take part in the research study titled:

"Exploring the experiences of intelligence test development/adaptation experts and psychologists/psychometrists who have administered intelligence instruments to South African school learners in various contexts".

I declare that:

- I have read this information/it was explained to me by a trusted person in a language with which I am fluent and comfortable.
- The research was clearly explained to me.
- I have had a chance to ask questions to both the person getting the consent from me, as well as the researcher and all my questions have been answered.
- I understand that taking part in this study is voluntary and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be handled in a negative way if I do so.
- I may be asked to leave the study before it has finished, if the researcher feels it is in the best interest, or if I do not follow the study plan, as agreed to.

Signed at (place) on (date) 20....

.....
Signature of participant

.....
Signature of witness

Declaration by person obtaining consent

I (name) declare that:

- I clearly and in detail explained the information in this document to
.....
- I did/did not use an interpreter.
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I gave him/her time to discuss it with others if he/she wished to do so.

Signed at (place) on (date) 20....

.....
Signature of person obtaining consent

Declaration by researcher

I (name) declare that:

- I had the information in this document explained to the participant by the independent person who I trained for this purpose.
- I did not use an interpreter.
- The informed consent was obtained by an independent person.
- I am satisfied that he/she adequately understands all aspects of the research, as described above.
- I am satisfied that he/she had time to discuss it with others if he/she wished to do so.

Signed at (place) on (date) 20...

.....
Signature of researcher

Current details: (23239522) G:\My Drive\G. Research and Postgraduate Education\G.1.5.6 Forms\HREC\G.1.5.6_NWU-HREC_ICF_Template_Feb2019.docm
7 February 2019

File reference: G.1.5.6