Section Three

Transparadigmatic methods
Introduction

Despite significant political and social reforms over the past two decades, South Africa continues to grapple with numerous challenges including, inter alia, unemployment, income inequality, land reform, lack of access to basic services, violence, gender-based violence, inadequate housing, racism, sexism, homophobia, crime, xenophobia and environmental crises (Dubow, 2012). Even with many rights being enshrined in the Constitution and global conventions, the creation of governance institutions to uphold citizens’ rights, and noticeable civil society activity in some domains (Chipkin & Meny-Gibert, 2013), social injustices remain and, in some instances, have worsened (Handmaker & Berkhout, 2010).

In light of this, South African social scientists are often encouraged to think about how their research contributes to a fair, just and equal society. The move towards a social justice orientation was influenced, in part, by the historical role of ‘scientific’ research in support of human rights violations (Duncan & Bowman, 2010), research that continues to neglect social injustices or is scientifically neutral about them (De la Rey & Ipser, 2004), and the suggestion that researchers, who typically occupy privileged positions, should be morally obliged to focus their work on marginalised, oppressed and disempowered groups (Daniels, 2001).

This chapter focuses on transformative mixed methods research, which is the integration of quantitative and qualitative methods framed within what has come to be known as the ‘transformative’ paradigm. The chapter was informed by three related gaps. First, despite the wealth of insights emerging from the mixed methods literature, mixed methods studies continue to be underrepresented in the social science literature (Ngulube, Mokwatlo & Ndwandwe, 2009) and, when they are used, they are framed simplistically without much attention to the integration of quantitative and qualitative methods (Barnes, 2012). Second, many social science research studies, regardless of methods, remain irrelevant to the needs of South African society and, in some instances, may inadvertently reproduce social injustices (Macleod, 2004). Third, methodological texts on ‘how to do’ transformative research are mostly written from the global North and are removed from ‘real world’ research in the global South.
In response to these gaps, in the first part of this chapter I introduce the reader to the role of paradigms in research methods and describe how mixed methods research, when framed by a transformative paradigm, has the potential to contribute to a social justice agenda. In the second part of the chapter, I highlight a number of critiques of transformative mixed methods, including those that have been overlooked in the literature. In the final part of the chapter, I present a number of questions and suggestions that researchers should consider when conducting a transformative mixed methods study.

Mixed methods and the transformative paradigm

A paradigm is defined here as ‘systems of beliefs that influence how researchers select both the questions they study and the methods they use to study them’ (Morgan, 2007, p. 49). Historically, quantitative and qualitative methods were thought to be incompatible because they were informed by different paradigms. The contemporary mixed methods movement, however, not only rejects the ‘incompatibility thesis’ (Howe, 1988) but also believes that quantitative and qualitative methods can be combined under a single paradigm with its own set of philosophical, methodological and practice guidelines (Burke Johnson & Onwuegbuzie, 2004).

There are a number of ways in which paradigms can be conceptualised but the most influential has been the epistemological stances (Morgan, 2007). These have historically asked four main questions of every paradigm: What is the nature of the social world (ontology)? What is the relationship between the researcher and the social world (epistemology)? What are the best ways to obtain information about the social world (methodology)? How do researchers’ values, worldviews and ethics contribute to their research (axiology) (Lincoln, Lynham & Guba, 2011)?

The epistemological stance, in its most simplistic form, positions quantitative and qualitative methods within two paradigms – post-positivism and constructivism. At the level of ontology, post-positivism suggests that there is a set of truths and causal relationships that exist and can be measured and analysed quantitatively. Constructivism, however, focuses on people’s subjective perceptions and experiences of the social world and suggests that multiple versions of reality may exist. At the level of epistemology, post-positivism suggests that researchers should be objective and distance themselves from their ‘subjects’, while constructivism suggests that it is perfectly acceptable for researchers to be empathetic, subjective and participatory. In terms of methods, post-positivism favours quantitative methods, while constructivism favours qualitative methods. At the level of axiology, both post-positivism and constructivism focus on the ethics of research – all research needs to adhere to ethical codes of conduct and principles. Constructivism, however, is more amenable to the inclusion of the researcher’s values in the research project.

Among others, pragmatism (Feilzer, 2010), dialecticism (Greene & Hall, 2010), realism (Maxwell & Mittapalli, 2010) and feminism (Hesse-Biber, 2010) have all
been suggested as overarching paradigms for mixed methods research. The transformative paradigm (the focus of this chapter) draws on a number of (critical) philosophical and theoretical influences including, but not limited to, critical race theory, feminism, critical disability theory and queer theory to frame mixed methods studies (Mertens, 2003, 2010). The transformative paradigm focuses on ‘the realisation that discrimination and oppression are pervasive and that researchers have a moral responsibility to understand the communities in which they work in order to challenge societal processes that maintain the status quo’ (Mertens, 2003, p. 49). Equally important is the acknowledgement that methodological choices play a role in inequality and that there is, therefore, a need to understand how power operates at each stage of the research process through, for example, interrogating the types of questions that are asked, who asks them, who participates in the research, the appropriateness of the instruments, how results are interpreted and how certain groups are represented and given ‘voice’.

When used to frame mixed methods research, at the ontological level, the transformative paradigm suggests that both ‘real’ oppression as well as participants’ perceptions and experiences of that oppression are important. Significantly, multiple representations of reality may exist, but researchers have an important task to distinguish between as well as privilege certain accounts over others in line with one or more social justice theories or frameworks. These viewpoints need to be contextualised within ‘political, cultural, historical and economic value systems to understand the basis for difference’ (Mertens, 2003, p. 75). Epistemologically, the mixed methods researcher not only actively engages with the intersubjective (being both objective and subjective) but is particularly interested in, and reflexive of, the historical, class and racial influences in the relationship between the researcher and participants and the type of knowledge that is produced. On a methodological level, quantitative and qualitative methods are mixed to design locally appropriate measurement instruments, to inform the design of appropriate interventions and to develop/expand locally relevant theories and models that promote the interests of marginalised groups. It is assumed that a mixed methods approach provides richer insights into the research topic than quantitative or qualitative methods could reveal alone. Importantly, the research often includes participants who are typically excluded or underrepresented in the research to frame and interpret the results.

The transformative paradigm foregrounds axiology, perhaps even more so than post-positivism and constructivism. Researchers are called on to interrogate not only the methodological and ethical integrity of the study, but also how the researcher’s axiological assumptions play a role in social justice research. The focus is on the researcher’s values, worldviews and cross-cultural competencies. Transformative mixed methods research also emphasises methodological flexibility, which allows the researcher the opportunity to be flexible during the study, especially as new insights or unexpected findings emerge. Relatedly, transformative mixed methods emphasise the cyclical nature of research, where researchers often move between phases as and when needed. In addition, participants are actively engaged in the research process not only as providers of information but also in the design, interpretation and dissemination of research
findings, thereby lending a ‘voice’ to their concerns. In sum, transformative mixed methods research does not conduct research ‘on’ participants but ‘with’ them (Gomez, 2014).

Transformative mixed methods studies have been used in South Africa in a number of ways, including to expand our understandings of key South African social (in)justice issues by focusing on both their magnitude (using quantitative methods) as well as participants’ perceptions of those issues (using qualitative methods). Examples include studies that have focused on water access amongst rural communities to argue for basic service access (Geere, Hunter & Jagals, 2010); intergroup contact and racism (Dixon & Durrheim, 2003; Durrheim, Trotter, Piper & Manicom, 2004); human immunodeficiency virus (HIV) and equitable mental health (Kelly, Freeman, Nkomo & Ntlabati, 2009); support needs of older HIV and AIDS caregivers (Petros, 2012); race, identity and geographical inequality (Van Ommen & Painter, 2005); sexual harassment (Van Wijk, Finchilescu & Tredoux, 2009); and mental healthcare inequality (Myers, Louw & Fakier, 2007).

In addition, mixed methods have demonstrated their transformative potential through the development of locally relevant instruments and intervention studies. For example, in South African psychological research, qualitative studies have been used to design locally appropriate quantitative intervention studies (Chirawodza et al., 2009) and psychometric instruments (Jones & Kagee, 2005; Kagee, 2005) in contexts where western models, interventions and instruments would have been inappropriate. Mixed methods have also been used in contexts where unexpected findings have necessitated further phases of research and interpretation (Barnes, 2010). Arguably, the use of mixed methods in the above studies provided a more holistic understanding of their topics of investigation than mono methods would have done alone.

Critiques of transformative mixed methods

The first critique is levelled at the loose nature of the transformative paradigm. It could be argued that the transformative paradigm is a catch-all meta-paradigm that attempts to consolidate a number of critical, emancipatory and liberatory paradigms. The problem, however, is that the transformative paradigm overlooks important nuances within and between the paradigms to which it lays claim. For example, despite the fact that so-called third world feminists’ work is arguably ‘transformative’, they would probably reject being uncritically lumped together with western feminisms under a single paradigm. They would be even more uncomfortable with being lumped together with other ‘critical’ paradigms that have arguably reproduced or, at the very least, overlooked gender inequities in the global South. While the loose nature of the transformative paradigm may be appealing, the reader should be aware of the complexity of the paradigm debates subsumed in the transformative paradigm.

The second critique focuses on the taken-for-granted link between mixed methods and the transformative paradigm. It is important to remember that both qualitative and quantitative methods can be ‘transformative’. It might
come as a surprise to some that quantitative research can be transformative, yet excellent examples exist of quantitative research aimed at social injustices (see Cokely & Awad, 2013). Similarly, the majority of mixed methods studies do not contribute to a social justice agenda. In cannot be true, therefore, that a methodological preference is necessary or sufficient to contribute to social justice. Rather, it is the combination of paradigm and method that influences the extent to which a study contributes to social justice. When setting out on a study, it is therefore important to ask (and justify) what it is about transformative mixed methods that will contribute to a better understanding than mono methods or mixed methods using a different paradigm.

It is important to note too that even the need for an overarching paradigm has been questioned by some mixed methodologists. There are three different ways that the mixed methods literature has engaged with the notion of ‘paradigms’. The first is that there is no connection between methods and paradigms and that methodological choices should not be dependent on paradigms. This group conducts mixed methods research regardless of paradigms. A second group appreciates the value of combining quantitative and qualitative methods but believes that the two methods draw on separate paradigms and contribute different things to the research domain (multimethods research would fall into this category). The third, and most active, group attempts to find a single paradigm that could provide an overarching philosophical basis for the combination of qualitative and quantitative methods. This group rejects the notion that quantitative and qualitative methods are distinct, believes there are more similarities than differences between them and contends that they can be meaningfully integrated under one paradigm. Transformative mixed methods, as I have presented them above, would belong to the third group.

A third critique focuses on the definition of ‘social justice’. Transformative mixed methods research claims to contribute to social justice, but what exactly do we mean by this (Barnes, 2018)? It is often assumed that we agree what social justice is and how we can achieve it. We imagine that our transformative research contributes more to social justice than those mixed methods studies positioned in other paradigms or mono methods. Yet, the complexity of social justice is often overlooked by the transformative mixed methods literature. Social justice is contested in terms of its definitions; theories; rights, liberties and obligations implied within those theories; and the institutions, laws and structures that are meant to uphold social justice (Pratt, Zion & Loff, 2012). There are also different foci of social justice, including how resources should be distributed (distributive justice); the laws, organisations and governance structures (procedural justice); and how people are treated with dignity and respect (interactional justice) (Jost & Kay, 2010).

It is thus simplistic to imagine that we are unified in what we think social injustices are and how to overcome them. It is also a mistake to assume that the key actors in any given study – funders, researchers, fieldworkers and research participants – agree what social justice is or how to go about achieving it. Contrary to the representations in methods texts of one researcher, or a team of like-minded researchers, working with marginalised communities to ‘improve’
their lives, real-world transformative research is much messier and involves much more complicated ideas about ‘social justice’ and how to achieve it than is represented in the literature.

A fourth critique questions how much choice researchers in the global South have in deciding whether or not to use transformative mixed methods research (Barnes, 2018). Researchers are often represented as ‘choosing’ a transformative mixed methods design based on a moral imperative to do so. The representation of researchers working with a community using mixed methods because they ‘choose’ to do so is, in fact, a privileged position. In reality, researchers in the global South are often positioned in large research teams where the research is funded and designed by donors and researchers in the global North. Researchers in the global South are sometimes positioned as skilled fieldwork managers with little or no conceptual role in the design, data collection and interpretation. The situation is exacerbated by the ‘consultant’ culture in many parts of the global South where researchers are compelled to do consulting work for a living at the mercy of donor agencies whose focal areas and methodological preferences are constantly evolving.

A fifth critique focuses on transformative mixed methods’ emphasis on ‘empowerment’ as a means to achieve social justice. The literature imagines that social scientists work ‘with’ not ‘on’ marginalised communities, educating them on their rights, offering them a ‘voice’ in and through the final research product and, in the process, empowering them to reduce social injustice. The focus on empowerment is particularly noticeable in the psy-sciences, where the emphasis of much transformative research is often on identifying the psychosocial ‘vectors’ of social injustice and attempting to reduce injustices through improving participants’ knowledge, agency, volition, participation in governance processes and social capital (Winter & Hanley, 2015). Researchers are positioned as ‘change agents’ who not only give voice to the marginalised through their research but also in the process educate them on their rights, liberties and appropriate channels to remedy the situation.

However, some authors have been critical of the individualist assumptions of ‘empowerment’, in particular the assumption that improving the manner in which marginalised communities ‘think’ about their circumstances will stimulate them and/or others to act if they are motivated enough and if their environments are conducive to change (Cooke & Kothari, 2001). Importantly, structural, environmental and material barriers beyond the control of individuals, such as poverty and income inequality, are stronger predictors of social injustices than perceptions, attitudes and behaviours. Educating people about what they probably knew already and about governance structures that they know do not work, and not addressing the wider sociopolitical challenges that cause social injustice, is unlikely to lead to change.

Putting aside paradigmatic issues for a moment, a sixth set of critiques focuses on the limitations of mixed methods, including the fact that mixed methods research studies are often expensive to conduct, time consuming and require a high level of research skill in both quantitative and qualitative methods. It is also sometimes difficult to integrate the two methods; difficult to find exemplars of good mixed methods research; there are still disagreements about the purpose, definitions and practice guidelines of mixed methods research; and mixed
methods sometimes lead to discordant findings which are at times difficult to reconcile (Teddlie & Tashakkori, 2010).

Transformative mixed methods
design considerations

This section focuses on designing transformative mixed methods research. Rather than being prescriptive, I raise a list of questions and suggestions that should be considered at the various stages of the research process. It is important to note that the list is not meant to be exhaustive. You will notice, for example, that there are no suggestions related to sampling, data collection or analysis. The reader is encouraged to read texts such as Teddlie and Tashakkori (2010), Creswell (2003) and Mertens (2003) for mixed methods design advice. Rather, this section is meant to stimulate transformative mixed methods thinking in domains that are not extensively covered in existing texts. It also includes issues related to real-world research in the global South.

Conceptualisation

When designing transformative mixed methods research, it is important to consider the following questions: What have existing studies on your topic revealed? What are the assumptions of the existing literature? What are the assumptions represented in the media and everyday talk? How do those assumptions support or deviate from your worldview, ethics, values and theoretical orientation? What is your understanding of social justice? Whose voices are being privileged and whose are being overlooked in the knowledge(s) being produced on the topic? How does the topic fit in with existing social justice frameworks and laws? Which institutions are obliged to uphold the rights and liberties of the group/issue? What exactly would you consider to be ‘justice’ for this particular topic/group in an ideal world? Are you interested in distributive, procedural and/or interactional justice? What do you hope to achieve with this study? For example, do you wish to highlight the extent of the injustice, offer reasons why the injustice may be taking place, evaluate programmes to address the injustice and/or investigate to what extent laws and policies are being enacted in relation to the injustice? What are the known or assumed mechanisms of injustice?

Context

Although many of the questions in this section will not be included in the final research output, they are important to consider in how the study unfolds, is interpreted and disseminated. If the study is part of a funded project, what are the funders’ theories/frameworks about social justice? Do their understandings of social justice dovetail with yours? What are the funders’ aims for the research project and do they dovetail with yours? How prescriptive are the funders in terms of study design, implementation and interpretation? At what stage are you called in to the study – for example, at the beginning or during the study, perhaps to rescue a part of it that has gone wrong? How are you positioned within the
study (as principal investigator, co-investigator, country representative or fieldwork manager)? Who are the actors involved in the study? Do they have particular social justice agendas? Are there private organisations, non-governmental organisations (NGOs) and/or community organisations involved in the study? What is at stake if your findings (or interpretations thereof) contradict or undermine their work? For example, in programme evaluation work, it is not uncommon to discover problems in the implementation of programmes by community NGOs. Will the NGO risk losing funding if these are highlighted?

**Research questions**

Once a gap in existing knowledge has been established, and you believe that that gap can be addressed using transformative mixed methods, you will need to develop a set of research questions. A good mixed methods research question should include a quantitative question, a qualitative question and a mixed methods question (Collins & O’Cathain, 2009). It is important that the mixed methods question is an overarching question that should ‘speak’ to both the quantitative and qualitative study (Tashakkori & Creswell, 2007). A useful mixed methods question should compel the author(s) to reflect not only on answering the quantitative and qualitative questions separately but, importantly, on integrating the two (Barnes, 2012). For example, can a community mobilisation intervention promote environmental justice in low-income communities and why (mixed)? What are the changes in environmental justice indicators following community mobilisation activities (quantitative)? What are the factors that influence environmental justice in low-income communities (qualitative)? The research question should also represent your position on social justice and a commitment to a transformative agenda (Okimoto, 2014). It is important to ask who is driving the research question – the researcher, funders, beneficiaries, local politicians or NGOs? Whose interests do the research questions ultimately serve and what do the research question(s) overlook?

**Study design**

It is imperative to be clear about the rationales for mixing methods. These include triangulation (one method is used to validate or improve the consistency of findings of the other method), complementarity (quantitative and qualitative methods are used to discover overlapping and possibly different aspects of a phenomenon), development (one method is used to develop the other method or stage of research), initiation (mixed methods are used to discover a paradox or fresh understanding of the topic) and expansion (mixed methods are used to expand the scope of a study) (see Greene, Caracelli & Graham, 1989). Further questions need to be considered when designing a mixed methods study (Creswell, 2003): What is the implementation sequence of the mixed methods design? Will one method be implemented before the other (sequential design) or will they be implemented at the same time (concurrent design)? What priority will be given to the quantitative versus the qualitative components – in other words, which will hold more weight? At what stage will mixing take place (at integration, data collection, interpretation and/or write-up)?
Based on your research question, the study purpose and theoretical orientation, a number of mixed designs are possible. The sequential explanatory design is one of the most commonly used mixed methods designs. It involves two phases – a quantitative phase followed by a qualitative phase. The latter phase is usually used to explain the results of the quantitative phase. Priority is typically given to the quantitative phase although in some cases the qualitative phase may reveal interesting findings that may raise its status to being equal to the quantitative phase. Mixing can occur at each level of the research process. In terms of Greene et al.’s (1989) typology, sequential explanatory studies generally allow for complementarity and initiation (finding new insights and so forth). They might also serve a validation function. The advantages of the sequential explanatory design are that it is relatively simple to design, implement and report. The main disadvantage is the length of time it sometimes takes, especially if both phases involve time-consuming data collection activities and if time is needed to interpret the quantitative findings before implementing the quantitative data. A further practical problem at the proposal stage is that it is very difficult to be able to develop a final qualitative instrument as it is usually not possible to know in advance what the quantitative phase will yield. This becomes problematic for institutional ethics review (Barnes, 2012).

The sequential exploratory design is conducted over two phases, with the qualitative phase being conducted first followed by the quantitative phase. The aim of the sequential design is 1) to use the data from the qualitative phase of the study to develop the quantitative phase, in which case the quantitative phase is given priority; or 2) for the quantitative phase to answer questions that arise from the qualitative phase, in which case the qualitative phase is given priority. The sequential exploratory study can contribute to development, complementarity or initiation of new ideas (Greene et al., 1989). The advantages of this design are that it is simple and straightforward, easy to report and may lead to useful insights. Similarly, the addition of a quantitative phase may lead to increased confidence in the qualitative phase in contexts where quantitative methods are more highly regarded. It can be particularly useful in questionnaire development.

The concurrent triangulation design is usually implemented in a single phase, with the idea of using one method to validate, confirm or corroborate findings of the other method. The triangulation study offers researchers a useful tool to strengthen results and is relatively straightforward and less time consuming than sequential designs. However, researchers may find it difficult to commensurate quantitative and qualitative findings. They may also find it difficult to manage divergent findings which sometimes arise in mixed methods studies.

The concurrent nested design mixes quantitative and qualitative data in one phase. Unlike the triangulation strategy, one method is clearly dominant while the other is used either to answer a different research question or focus on subgroups within a larger group. It also differs from triangulation in that it is focused on a deeper understanding of a phenomenon and not an attempt to validate findings. It is particularly useful when researchers want to enrich their understanding of a particular issue, understand one particular strata in a more in-depth manner (e.g. quantitatively understand motivation in an organisation
while qualitatively understand the same phenomenon among managers) or utilise qualitative case studies in a quantitative experiment. Strengths and limitations are much the same as for the previously mentioned concurrent triangulation study.

Research quality

How do you know that you have done a good transformative mixed methods study? If we are to accept that quantitative and qualitative methods are informed by separate paradigms, then the traditional tools for assessing research quality will still hold: for example, validity and reliability (for quantitative studies) and dependability, transferability and trustworthiness (for qualitative studies). However, if we believe that mixed methods are a separate form of social enquiry with its own quality criteria, then it is important to consider how well researchers have been able to integrate quantitative and qualitative studies into one study.

The concept of legitimation (Onwuegbuzie & Burke Johnson, 2006) has been proposed as an overarching way of thinking about research quality in mixed methods designs. Examples of legitimation include sample integration legitimation (SIL), which refers to the degree to which the sampling strategy allows for quality inferences. The underlying logic is that the closer the sample is integrated, the higher the degree of transferability. However, using the same participants (particularly in sequential studies) may in itself lead to bias as participants’ responses may be influenced by participating in prior phases. On the other hand, using samples that are fundamentally different may weaken SIL.

Inside–outside legitimation (IOL) refers to the degree to which the researcher integrates both the research participants’ (inside) as well as the researchers’ (outside) views. IOL is particularly important for transformative research. It is important to be cautious about overly interpreting the data from an outsiders’ perspective and thereby ignoring the participants’ reality, or vice versa when the researcher becomes overly involved in the participants’ reality and struggles to be objective. Ensuring that participants’ voices are included and adequately represented in the research process is crucial for transformative mixed methods research. Onwuegbuzie and Burke Johnson (2006) suggest a number of internal checks for IOL, such as peer review of interpretation (legitimation of the outsider perspective) and/or asking participants if their interpretation is consistent with their reality (legitimation of the insider perspective). Checking IOL is not always feasible in many research contexts because of time and resource constraints, but it is important to consider.

Weakness minimisation legitimation (WML) refers to the extent to which the strengths of one method are used to address the weaknesses of the other. A study would have a weaker WML if it asked similar questions in both methods – for example, both a quantitative questionnaire and qualitative interviews asking why an intervention worked or did not. On the contrary, a study might have a stronger WML if the qualitative study is designed to ask questions that the quantitative study is not designed to ask – for example, if the quantitative study focuses on how much the intervention worked while the qualitative study focuses on why it worked or not.
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**Ethics**
In addition to conventional criteria such as informed consent, ensuring that participants understand the study and confidentiality, there may be ethics issues unique to transformative mixed methods (Preissle, Glover-Kudon, Rohan, Boehm & De Groff, 2015). In sequential studies, for example, where one phase of research informs subsequent phases, it is sometimes difficult to obtain ethics permission for subsequent phases because you do not know what the first phase will find. It is possible, however, to apply for ethics clearance for each phase, but this can be time consuming and onerous. In addition, in some sequential designs the same sample is used in both phases so it is important to inform participants that they may be selected for both phases and what this might entail.

It is vital to be constantly reflexive of the transformative questions raised in previous sections, including whose interests the study serves, who gets to speak on behalf of beneficiaries, what is at stake for community organisations, to what extent beneficiaries have been consulted throughout the research process and the politics of representation. Often overlooked are ethical issues of how research team members are treated within studies, particularly subcontracted data collectors and fieldworkers who sometimes work under difficult conditions.

**Concluding remarks**
This chapter introduced the reader to the transformative paradigm and the role of transformative mixed methods research in social justice research. The chapter described the strengths as well as critiques of transformative research and highlighted a number of key issues for researchers to consider as they conduct transformative mixed methods research. Transformative mixed methods studies are useful tools to frame social justice research. It is important, however, to remember that transformative mixed methods research is far more complicated than what is often represented in the literature. It is hoped that this chapter will assist researchers to conduct transformative mixed methods research with the goal of promoting social justice in South Africa.

**References**


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