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Teachers' experiences of indigenous games in the early grades

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Background: This research foregrounds inclusive education (IE) values by way of indigenous games. The outline of the South African national curriculum states that its main aim is to teach its children and youth to become members of a refinement that supports the values which are democratic, the human rights, and communal justice. However, the associated instructional methodologies that have long been a societal tool in instilling these values at an early stage of child development have been largely disregarded in achieving this goal. Indigenous games rely on specific values and traits from children's cultural heritage.

Aim: The study aimed to find out how teachers experience the use of indigenous games in teaching mathematics in IE schools.

Setting: Six IE schools in the KwaZulu-Natal province in South Africa.

Methods: Semistructured interviews and teacher narratives, framed by the philosophy of *ubuntu*, were employed to generate data. These data were analysed in conventional qualitative methodology fashion.

Results: The study showed that teachers believe that indigenous games encourage and endorse spontaneous interaction among learners as they communicate with their classmates and recognise the form of play from their community life.

Conclusion: Teachers require specialised IE programmes as well as pedagogical formats to advance indigenous games.

Keywords: African; indigenous games; early grades; inclusive education; *ubuntu* philosophy.

Introduction

Indigenous games can play a pivotal role in teaching the learners in the foundation phase (FP) a variety of skills. Foundation phase teachers are encouraged to use indigenous knowledge systems (IKS) to enhance their culture-based mathematics teaching. The advantage of IKS-based games is that these games allow the learners to enjoy playing a game they know while learning a new skill at the same time. Early grades children have usually learned many of the games in their preschool years.

Studies in anthropology point to the fact that indigenous philosophies had fully developed cosmologies that explained what they were and where they were coined from, setting out their place in relation to the world (Akinola & Uzodike 2018; Mahoso 2013; Sigauke & Mawere 2014). However, there is research that indicates that IKS-based games are seen as 'other', and this state of affairs sadly continues to perpetuate race and class divisions in society. Indigenous methodologies and pedagogies have almost vanished, their existence confined to distant memories of some parents and community members (Kovačević & Opic 2013). The Department of Basic Education (DBE) has identified indigenous knowledge as an advantage that can be incorporated into the school curriculum in order to educate African children about, for example, *ubuntu* philosophy and cultural beliefs (Nxumalo & Mncube 2018). They continue to reveal that effectiveness of indigenous methods to teach schoolchildren these important concepts have, however, largely remained unstudied.

Mutekwe (2015) argues that this state of affairs is because of a lack of establishment for African IKS in school curricula internationally, and therefore it is clear that the problem is not only in South Africa. Indigenous knowledge systems include the oral tradition, such as proverbs, maxims, poems and songs, indigenous games and sociocultural structures, such as rites of passage, norms, customs and the tutelage of apprentices by those who are specialists in their fields of traditional medicine, agriculture, pottery, art, music and so on. This study's particular importance is the

communication of African philosophy and axiology through indigenous games and knowledge for building a foundation for *ubuntu* values in educating African learners. *Ubuntu* is encapsulated by the maxim 'umuntu ngumuntu ngabantu', which means 'to be a human being is to sustain one's humankind by recognising the humanity of others and, on that basis, establish humane relations with them' (Chikoko, Naicker & Mthiyane 2015:3). In most African languages, this communication seeks to underscore the importance of self because of others (Mugumbate & Nyanguru 2013). In this paper, I argue that learners can be taught *ubuntu* values through participation in well-thought-out indigenous pedagogies, including indigenous games.

Foundation Phase teachers in Nutti's study (2013) offer examples of how mathematics teaching can be integrated into an inclusive education school context by implementing culture-based mathematics activities in preschool and school. Furthermore, the use of indigenous games taps into the knowing, belief systems and cultures of indigenous learners, optimise learners' understanding of concepts and increases meaningful participation in the classroom's academic activities. Storytelling and games are part of the most relevant indigenous activities that can be used effectively to encourage learners' interest and active participation in learning activities. Within an inclusive education context, such as schools for learners with special educational needs, there is a high probability that teachers may encounter a positive reaction to culturally rich pedagogy. (Yang & Rusli 2012). Teachers are generally nervous about their quality of training to cater to indigenous games to teach mathematics in the foundation phase because of their one-sided academic training (Li et al. 2017). Indigenous games recognise that culturally inclusive, high-quality early learners' development and education programmes can help learners get the best start in life. Ball and Simpkins (2004) argue that IKS should be integrated into the early learning curriculum, and their findings have implications for indigenous understanding being transferred through trusted, responsible teachers. Nkopodi and Mosimege (2009) argue that the view that games, as a category of human activity, are easier to recognise than define. They further identify three properties, which, if not sufficient to define the category unambiguously, are in practice common to almost all games. Learners play together; most of them tend to be very quiet to concentrate on the moves they are going to make; whenever any verbalisation takes place, it is in hushed tones, with verbal expressions that are scarce and far between. In the end, it is generally challenging to follow the cognitive process behind the learners' moves without asking them questions.

This study's primary aim was to explore how teachers were invoking some cultural value in the form of indigenous games. The study ultimately aimed to suggest ways for teachers to inculcate *ubuntu* values through such games and the cultural knowledge they represent. The aim was thus to produce usable knowledge for teachers through a systematic small-scale inquiry.

Indigenous games

In the game called 'three tins', to play this game, there must be three tins and a tennis ball, which is easy for the younger ones to hold with their tiny hands. During this game, they put each tin on top of the other, and one person must hit the stack of tins with the tennis ball and scatter them all. Then, the opponent side will grab the tennis ball and try to hit others with the ball while they are trying to put the tins back again. If they get hit before completing the stack, then they are out of the game, but when they manage to duck and complete the stack of tins, then they win the game. Another indigenous game uses stones; they will put stones on the ground inside a circle and play by throwing one stone on the air while pulling some stones out of the circle, pushing them back and leaving only one stone outside the circle. These games promote counting, and at the same time, coordination skills are learnt. During the lesson, the learners are able to share their knowledge about the different games as well as the rules for each game. The teachers are not imposing the games on the learners but rather give the learners an opportunity to share their knowledge too. Considering that the learners come from different neighbourhood where they play different games, they will be able to teach each other the different games.

The current study proposes to examine teachers' views about including indigenous games, along with touches of *ubuntu* philosophy, in early grades mathematics.

Teachers' experience in mathematics teaching with games

Mathematics teacher education programmes (in Western societies) traditionally believed that mathematics was something 'unfamiliar' and not rooted in African cultures (Gerdes 1998). Mathematics teaching literature notes essentially two schemes for classifying beliefs on teaching mathematics: a transmission approach where the teacher conducts information and rules to the students, who are expected to engage and reproduce them, and a constructivist approach in which teachers are facilitators of learning, and students construct their mathematical understanding through interaction with the environment (Burton 1993). In a South African context, an authentic constructivist pedagogy would assume that learners engage in various games like *morabaraba*, when they use several terms in the game. This is an opportunity that teachers can use to introduce, correct and highlight some of the mathematical concepts (such as geometric shapes, ratio and proportion, symmetry, building logical and intellectual skills and counting) that are part of the game being used. Learners should be encouraged to use the language of mathematics while playing the game so that their understanding of concepts can be noted. An alternative approach to getting an idea of learners' understanding would be to video-record the play in action. The video can then be replayed and paused at interludes so that the game can be analysed. Moves taken can be discussed, and the commonplace language used can be translated into mathematical language.

Learners can be asked to identify mathematical concepts applied during the game and construct the game board itself. Rules govern games and allow participants to estimate, predict and plan. They include virtually every curricular standard set forth by the National Council of Teachers of Mathematics (2013) in the United States of America, most specifically estimation, probability and operations. It seems only natural that teachers should increase their use of games in the classroom since playing them is a significant human activity that affords substantial chances to experience and explore mathematics within the context of culture. Indigenous games are very important when learners are learning; they allow learners to enjoy learning in a relaxed way, and when they are playing, they share knowledge and ideas freely. Comprehensive inclusive education is 'a development intended to respond to students' variety by increasing their involvement and reducing exclusion within and from education' (Altbach, Reisberg & Rumbley 2009:1).

The inquiry

This study explored teachers' use of indigenous games to teach mathematics in the Foundation Phase in the general education setting in six primary schools in KwaZulu-Natal. These FP learners are the most vulnerable group of learners, found at the periphery of the mainstream education system in South Africa. While most countries treat this group with the utmost care and respect, tangible interventions at both policy and implementation levels are necessary. Internationally, indigenous games to teach mathematics in the foundation phase are best catered for by qualified teachers who have been subjected to strict, specialised training. Previous studies have identified barriers to educating learners with indigenous games in mainstream education (Rosas et al. 2003; 2008; Waller et al. 2002; Zwane & Malale 2018). Some of the obstructions identified were lack of specialised service, books, resources and technology to ensure equal access to specialised curricula. The policy and practice suggest that despite the formalisation of inclusive education in public schools, the delivery of education through indigenous games to teach mathematics to learners in their early years remains questionable. This study zooms in on teachers using indigenous games to teach mathematics to FP learners to explore these teachers' experiences as they implement the curriculum and their daily interactions with their learners.

The study aimed at examining teachers' experiences in order to understand this way of teaching mathematics and recognise how it differs from other approaches to mathematics education, which were manifest in the perceptions and experiences of teachers teaching in the early grades.

Methods

The was a qualitative case study of six FP teachers working in inclusive schools in a rural area. Yin (2004, 2011) and Baxter and Jack (2008) propose that a qualitative case study allows the flexibility of collecting, analysing and interpreting data, elaborating or refocusing research questions and identifying and dealing with validity threats at the same time. All the participants were teaching in the foundation phase, that is, Grades R to 3. The research site was chosen based on availability and convenience from public school sites that included indigenous games to teach mathematics in the foundation phase. Three methods were used to generate data: semistructured interviews, semistructured observations and document analysis. Semistructured interviews were conducted with teachers teaching mathematics to FP learners. The interview schedule required participants to respond to the protocol questions while talking about their experiences of using indigenous games to teach mathematics to FP learners. Document analysis was performed on the school policies, teachers' files and the learners' workbooks.

Sampling and data generation and analysis methods

This study applied purposive sampling to identify and select participants. Maree and Van Der Westhuizen (2009:79) define purposive sampling as 'the selection of participants based on some definite specific characteristics that qualify them to be holders of required data for the study'. Six teachers working with indigenous games to teach mathematics to FP learners participated in the data generation process. These participants were master's students at the University of KwaZulu-Natal (two were male, and three were female). Ethical standards took precedence over the actions in the study to avoid conflicts of interest that might jeopardise the two universities' good name and protect participants' autonomy and dignity (Babbie & Mouton 2005). These ethical considerations were applied along with the main ethical principles of nonmaleficence and beneficence (Bertram & Christiansen 2014). In this regard, approval was sought from the Ethics Committee at the Faculty of Education, University of KwaZulu-Natal, after intense scrutiny and deliberation.

Participation in this study was voluntary (Oppenheimer, Meyvis & Davidenko 2009). To assert their autonomy, participants signed a consent form (Bertram & Christensen 2014). To ensure their identity was concealed, pseudonyms were used. The early grades teachers were identified with the pseudonyms Kate, Sthabana, Makuya, Landuwva, Ziphozezwe, and Ziphozonke.

The most appropriate data analysis strategy for the research questions was identifying themes and patterns while collecting, transcribing, editing and coding the field notes (Sutton & Austin 2015). Patience was required in contemplating suitable codes and maintaining a constant comparative analysis of data collected while categorising and coding data for explanation and clarity (Sangasubana 2011). In this regard, data analysis and interpretation involved triangulation in validating the information and drawing conclusions. Access was negotiated. This was a small-scale case study, and the results may not be generalised (eds. Terre Blanche et al. 2006). The study's trustworthiness was achieved

by carefully triangulating the data, whereby the results from different sources were compared to ensure that consensual conclusions were drawn throughout. According to Maxwell, Locke and Scheurich (2013), triangulation is an important measure that deepens the understanding of phenomena while maintaining different aspects of it.

Discussion of the findings

Findings from semistructured interviews and the focus groups were coded according to four emergent themes: (1) training and qualifications for using indigenous games to teach mathematics in the foundation phase; (2) the rewards and challenges of a teacher using indigenous games to teach mathematics in the foundation phase; (3) teaching beyond the curriculum.

Teachers' professional training and skills to facilitate inclusive education

The first theme that was identified from the coded and categorised data was teachers' professional training and skills to facilitate inclusive education (IE) in indigenous games. Participants were conversant with IE from both the practical and academic points of view. Their definition needed some clarity at times, as some were not clear what IE meant in the context of indigenous games. All participants could offer somewhat useful information on what it means and how the South African education system paraphrases the concept. It was clear that the research participants Ziphozezwe and Melokuhle agreed that understanding each other (*ubuntu*) allows learners to learn in their social spaces while being taught. Learning takes place when learners are engaged in social activities. Play pedagogies, discovery and game activities occur when the learners learn while the teachers incorporate play teaching strategy to interact with the appropriate teaching strategies for young learners in primary school.

These two responses were from two research participants whose responses gave the impression that they were aware that learners learn as they play. Hmelo-Silver (2004) argues that it is the facilitation of play that allows learners to construct their knowledge enjoyably. The responses suggest that the teachers in both contexts (rural and township) understood that learners learn as they involve themselves in games and singing songs. This finding supports the NAEYC and NCTM (2002), which state that when learners are exposed to different teaching approaches as they are taught mathematical skills, they understand the content and concepts better, as these are simplified by the resources used by teachers. The use of concrete, locally available materials, the contextualisation of games, songs and examples, and the engagement of learners in activities that would help them to gain a solid understanding of mathematics by asking 'why' and 'how' questions were also foci of the author's observations in endeavouring to do justice to the aims of the study.

Most of the teachers are professionally qualified in their pedagogical content knowledge, but there was a serious discrepancy that kept raising a red flag about all of them. They were bragging about how well qualified they were to work in this school, but they all lacked the specialised training necessary to use indigenous games to teach mathematics to foundation phase learners. The fact that most of them had studied psychology and education was not enough to elevate their status to teach a fragile group of learners with special needs. Two in the group mentioned the module called Special Education offered in the BEd programme at the University of KwaZulu-Natal for all students, and this was the only relevant module in the BEd programme. It was difficult to tell whether participants were capable of working with learners with special conditions. Their professional training was impeccable, but serious questions were raised about their skills in practice. As was to be expected, participants believed they had the minimum requisite content knowledge required to teach in the inclusive classroom and to use IKS-based games with a values-based philosophy such as *ubuntu*. Given that the environment demands specialised competencies, it was not clear how they could compensate for this critical deficiency in their teaching. In short, teachers were unable to say with certainty what skill sets they had, and this is an unfortunate state of affairs facing these schools. One could understand from their answers that these teachers would do anything to remain employed by the Department. In another set of responses, something intriguing was expressed about skills:

> 'I strategically allow learners to play games that will assist them in conceptualising mathematical terms. Some of these games were to discover what was important when learners are learning, and also they allow learners to appreciate and enjoy whilst learning in a relaxed way, and when they are playing, they share knowledge and ideas freely during playing games. I could see that they were fascinated by such learner-centred participation in mathematics. I do this to promote creative thinking for the learners in my classroom. I don't want [*them*] to be reliant on the theme all the time.' (Shabana)

Melokuhle found that she needed others to help her. She believed all members of her team were making a difference. Helping every member of her team empowered them to work as a unit to educate the students with indigenous games. This participant recognised the needs of students in the FP, which always vary significantly from those in senior primary schools, but agreed that with time the level of competence improves. Working with indigenous games to teach mathematics to FP learners for one and a half years is considered nothing in relation to the magnitude of the work in their class. One of the strategies is to involve parents of these learners to reinforce skills.

Teachers in this study claimed that through their experience, they had learned some skills in using indigenous games to teach mathematics to FP learners. They had collaborated with experienced teachers and therapists who offered support for free. The Braille Unit supported new appointees with assistance in creating resources. Hlalele (2012) claims that collaboration between teachers, learners and other

professionals not only decreases the challenges the teachers face but ensures that the learners are supported.

Teachers' experience of academic and extracurricular activities

The second theme to be identified in this study focused on teachers' priorities that keep them motivated between academic and extracurricular activities. It was clear that participants who teach indigenous games prioritise instructions in the academic curriculum over noncurriculum areas. In most cases, teachers are usually forced by their tight schedules to always lean towards academic instruction, inadvertently neglecting other important extracurricular activities:

> 'I am sure that what makes parents excited is to see their kids returning home with practical evidence that something of value is taking place at school. Seeing them writing, pronouncing words, using strategies for learning to navigate in the house puts a smile on their faces. Teaching and learning are about what learners know and understand well whilst having so much value in their skills by playing the games. The most significant skill is in learners' belief that the teacher trusts and is willing to listen to them. I have opened up to listening more and to observe learners in order to be able to connect with them on a relational level, and they respond better with me.' (Shabana)

> 'My sole responsibility as a teacher is to introduce the concept to the learners and through skills. These are the most critical areas that form the foundation of indigenous games' programme to teach mathematics to foundation phase learners. Everything we do is built on this firm foundation. Let me hasten to say that we do combine extracurricular activities with these skills, but we believe that schools should hire relevant people to keep these learners active and always sports-savvy.' (Kate)

Lynch and Mendelsohn (2013) argue that compensatory skills focus on concept development, spatial understanding, communication needs, speaking and listening, study and organisation. These participants championed the development of these important skills for learners and pointed out that their difficulty is when these learners are not making enough progress in these areas. Indeed, these skills are part of the academic curriculum vital for learners to master and understand for assessment purposes. Makuya and Melokuhle are experienced in using indigenous games to teach mathematics to FP learners and acknowledge the need for extracurricular activities.

The development of compensatory skills dominated the whole discussion concerning priorities, and in this regard, these teachers who use indigenous games to teach mathematics to FP learners agreed to expand their scope. They referred to moving away from a one-dimensional perspective of only developing compensatory skills and allowing other nonacademic activities to be part of the daily curriculum. The issue for further discussion was the support in terms of workforce and within the school setup. Some teachers take the inclusive education idea as a joke aimed at those teachers of less important subjects who need sympathy. It was heart-breaking to hear these professionals complaining about the different languages and indigenous games they did not understand while claiming that they understood inclusive education. The lack of important teaching resources confirmed their suspicion and indicated the real frustration that Ziphozonke was trying to highlight in her viewpoint:

> 'For your information, learners' understanding of indigenous games also assists other students they play with; they teach each other. They bring some resources that are meant to cover extracurricular activities for this group. As you can imagine, their movement is limited, and they need real resources to help them play and develop full mobility, moving and laughing and appreciating themselves whilst playing the game. I felt proud that we were learning about our culture and playing our indigenous games and that the nonindigenous learners probably loved it too. While these learner voices illustrate that the learners had different reasons for enjoying the experience, the sense of sharing and group participation was strong. After all, they were kids.' (Ziphozonke)

Teaching beyond the curriculum

The fourth theme prompted the issue of what teachers offer beyond the curriculum. It emerged very clearly that learners with indigenous games need highly dedicated, responsible and visionary teachers. These professionals teach beyond the traditional curriculum. Many issues that were identified in this section were considered, and some that were not articulated well were left out of this study. Participants highlighted four important issues that changed their outlook and motivated them to work even harder to assist learners with indigenous games. Ziphozonke was focused on mobility and orientation skills, while Ziphozezwe saw independent living skills as fundamental in working with these learners.

These two participants were happy to develop these skills that are important for using indigenous games to teach mathematics to FP learners, but over and above these, one teacher raised the important issue of self-appraisal and self-actualisation. The researchers never expected this to be an issue, but the way it was justified gave hope about the calibre of teachers in these schools. Learners are taught about their rights and responsibilities in the broad scheme of things in South Africa:

> 'I always make an effort to encourage them to know that they are allowed to bring their backgrounds into the classroom. This seems to be interesting to them, as they can communicate about their families and their relationships, bring relevance to their learning, know their rights as people living with indigenous games and that their decisions should always depend on their natural abilities and strengths. They must know that they have the right to make choices that suit their needs and wants and know how to solve problems independently, set their goals and achieve them.' (Shabana)

According to the participants, it is very important to empower FP learners to become independent and successful using indigenous games to teach mathematics (Downing 2010). Knowing their goals and working towards achieving them is significant for their professional and personal development.

Indigenous games play a significant role in the socialisation of children (Marsh & Marsh 2008). Researchers like Martlew, Stephen and Ellis (2011) and Honeyford and Boyd (2015) have documented the significant role of learning through play for children, especially in the lower grades. In this regard, games can be adapted to suit a variety of social, cognitive and affective needs of children. For example, the *ushumpu* game has been successfully used as a therapeutic tool (Dipale 2013). The incorporation of indigenous games into learning and teaching in the classroom could be a great asset in developing self-confidence and self-identity and accelerating active participation, healthy living and the higher academic achievement of indigenous children in most school subjects, especially mathematics.

Concluding remarks

In this article, I argue that indigenous games are rich in *ubuntu* philosophy and that they should be used in the school curriculum to instil *ubuntu* in learners. The use of *ubuntu* in the school curriculum has been shown to stimulate critical thinking and creativity and promote collective values in learners. Learners should be encouraged to teach and learn activities from their cultural background, such as indigenous games. The power of mathematics lies in its generic ability to apply in all situations, so mathematical understanding that is restricted in context, although useful as a beginning, should not be the endpoint of instruction. The jump to understanding mathematics through indigenous games like *umrabaraba* seemed quite fun for learners in the foundation phase. This research aimed to introduce the mathematics matrix, which has been developed as part of mathematics teaching, and celebrate the work teachers do in early learning. Anecdotal evidence from the Southern Mathematics Initiative participants suggests that the use of the mathematics matrix and the thinking behind it have had positive effects on the pedagogical practices of the early learner teachers involved. The learning stories assessment methodologies have allowed preschool teachers to meet their reporting obligations while remaining true to their early learner philosophies. In the African context, indigenous games are symbolic representations of cultural expression from a specific society, and children are bearers of cultural expression through these games (Roux, Burnett & Hollander 2008). However, in many African countries, and specifically in South Africa, the school curriculum has been dominated by Eurocentric knowledge, and most of the games used for learning and teaching have followed suit. Indigenous games have been marginalised, resulting in an effect on the maintenance of cultural knowledge, including expression of mathematical knowledge.

The infusion of indigenous methodologies and pedagogies into the curriculum should not eliminate or diminish the value of traditional Western methodologies and pedagogies that have been used in schools for decades. In this regard, formal and informal training and systems should co-exist, even though they might sometimes appear to be in a battle with one another (Seroto 2011). Through informal education, learners learn the norms and values of society, and ideally, this forms the foundation for later schooling. To this end, indigenous games can be used to craft and foster identity (Turner et al. 2003), where self-confidence can be affirmed and enhanced through pride and heritage while recognising, acknowledging and celebrating diversity (Young-Eisendrath 2008). The analysis and identification of related mathematical concepts should not be made without the connected and important *ubuntu* principles of the indigenous games' sociocultural context and implication. The teacher's role should also be to empower learners to relate concepts learned to their everyday life and, where possible, to their cultural heritage. With the digitalisation of education, I would argue that software that invokes IKS could be a powerful tool for early mathematics learning.

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Competing interests

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Author's contributions

B.N.H-N. is the sole author of this article.

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Data availability

Data will be available upon reasonable request.

Disclaimer

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