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Article:
Murris, K., Scott, F., Stjerne Thomsen, B. et al. (2022) Researching digital inequalities in children's play with technology in South Africa. Learning, Media and Technology, 48 (3). pp. 542-555. ISSN: 1743-9884

https://doi.org/10.1080/17439884.2022.2095570

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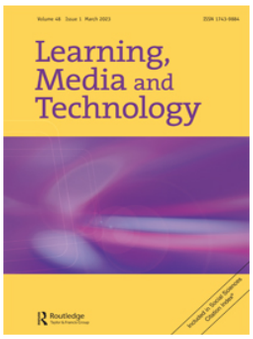

Learning, Media and Technology

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cjem20

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To cite this article: Karin Murris, Fiona Scott, Bo Stjerne Thomsen, Kerryn Dixon, Theresa Giorza, Joanne Peers & Chanique Lawrence (2022): Researching digital inequalities in children's play with technology in South Africa, Learning, Media and Technology, DOI: 10.1080/17439884.2022.2095570

To link to this article: https://doi.org/10.1080/17439884.2022.2095570

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LEARNING, MEDIA AND TECHNOLOGY
https://doi.org/10.1080/17439884.2022.2095570

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RESEARCH ARTICLE

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Researching digital inequalities in children's play with technology in South Africa

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ABSTRACT

This paper reports on the South African findings from an international mixed methods study between the LEGO Foundation, Dubit and the Universities of Sheffield (England) and Cape Town (South Africa) on young children's learning with digital technology. The findings of the study, the first of its kind in South Africa, show the consistency of qualities and experience of play, but also reveal socio-economic, linguistic, ethnic, gender and racial inequalities in the play environments of both groups of 3–11-year-olds. Yet, despite these structural inequalities, the play ecologies of children in resource-constrained environments show their creativity within the digital/non-digital environment. The paper discusses some of the analytical tools used and the geo-political issues raised, and considers these in conjunction with selected data. We conclude that the different socio-cultural conditions and geo-political realities offer new insights about the role global education research can play in helping combat structural inequalities in resource-constrained environments.

ARTICLE HISTORY
Received 17 October 2021
Accepted 20 June 2022

KEYWORDS
Digital inequalities; digital play; global education; South Africa

Introduction

Research in the Global North includes focused investigations into children's play, and digital play specifically (Burn and Richards 2014; Marsh et al. 2020; Osgood, Sakr, and de Rijke 2017; Potter and Cowan 2020), yet there is a paucity of both kinds of research in the Global South. Children have increasing access to digital technologies, which impacts upon play, but the findings of a recent mixed-method study on play with technology in South Africa, reported on in this paper, confirm the widening of the so-called 'digital divide' (Van Dijk and Hacker 2003; Van Deursen and Helsper 2015) and its impact on education in South Africa (2020; Chisango and Marongwe 2021). No-income or low-income children have little or no access to the technologies in their homes, educational settings, or communities (Lee et al. 2019, 340–341).

This collaborative large-scale study on children's learning through play with technology in South Africa found[1]:

1. Huge discrepancies in access to technology and levels of connectivity; many South African children have little or no access to digital games, in comparison to children from resource-rich

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This article has been corrected with minor changes. These changes do not impact the academic content of the article.

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communities in the UK. And even when there is access, there is a prevalence of Western, masculine narratives in digital games alien to African childhoods. The key concept of 'access' is explored further below.
2. Insufficient consideration has so far been given by digital play researchers to the role of the geo-political contexts of children's play by taking account of socio-economic, cultural, language, religious and other significant differences.
3. Children's play seamlessly moves between applications predominantly on one digital device (phone) and in between the digital and non-digital (e.g., visual diaries).

The Children, Technology and Play (CTAP) project researched children (aged 3–11) in school, home, and communities through mixed methods, across South Africa and the UK. The study's first two findings show the presence of the digital divide. It is evident that the digital divide is more than who has access to technology and who has not. Rather, it is a complex and dynamic term (Van Dijk and Hacker 2003). We see the digital divide as an intersecting relationship between access to resources and infrastructure, people's patterns of use and skills, and the structural inequalities embedded in societies that affect who, how, and the extent to which they can engage with technology. In addition, because the term has most often been used in relation to research focused on the global north it is important to take heed of Scheerder, van Deursen, and van Dijk's (2017) point in our methodologies that there is not enough attention paid to working with theoretically grounded categories in digital divide research which affects levels of comparability across bodies of work.

Nevertheless, despite the two very different cultural, socio-economic, linguistic, spatial, ethnic, and racial contexts, the third finding shows children's creativity and resourcefulness in South Africa. For example, they moved seamlessly between applications on one device (e.g., from a digital game to WhatsApp to video on the same phone) and moved comfortably between PlayStation enactments and the drawing of narrative images in visual diaries. Despite the limited access to technology and costs of cellular data which are embedded in the racial, linguistic, and social inequalities of South African society (Ng'ambi and Bozalek 2016); as well as the cultural differences in the way childhood is conceived in South Africa, the qualitative data show a wide range of examples of creative play. Through an example that we present in this article, we show how, without the assumed binaries in educational research (e.g., the digital/non-digital, online/offline), the capabilities, resourcefulness and resilience of South African children come to the fore even when they do not have unfettered internet connectivity.

The Children, Technology and Play (CTAP) Project

The Children, Technology and Play (CTAP) Project was a large-scale, international research project undertaken between 2019 and 2020. It was a collaborative study on young children's learning with digital technology undertaken by the Universities of Sheffield (England) and Cape Town (South Africa)[2], Dubit and the LEGO Foundation Foundation. All research participants (principals, teachers, parents, and children) had given individual consent for the use of the research instruments following BERA's Ethical Guidelines for Educational Research[3] and their names were kept confidential through the use of pseudonyms. The qualitative and quantitative findings of the first study of its kind identified the way in which technology impacts on children's play, creativity, and learning (Marsh et al. 2020). It confirms an earlier study (Marsh et al. 2016) that qualities and types of play are generally consistent across both digital and non-digital contexts. In this paper, we foreground some of the structural inequalities (socio-economic, linguistic, ethnic, and racial) that surfaced during the project.

The research project was mostly designed by the University of Sheffield in collaboration with the LEGO Foundation, whose interest in the project was to research the Learning through Play Experience Tool (LtPET)[4] they have developed, which is based on the five characteristics of play outlined by Zosh et al. (2017[5], 2018[6]) as joyful, actively engaging, iterative, meaningful, and socially interactive.

The study addressed the following six key research questions, as follows:

1. What is the relationship between children's use of technology and their play in everyday life?
2. What skills and knowledge do children develop in their play with technology?
3. What is the relationship between play, technology, and creativity?
4. How far does children's play with technology demonstrate the five characteristics of learning through play?
5. How do parents and adults facilitate children's play with technology, and what are their views on this issue?
6. To what extent is children's play with technology shaped by socio-cultural contexts?

To answer these research questions, a large quantitative survey was undertaken in both countries in which children's play with technology, and parental mediation of this, were explored. Telephone interviews were conducted and case studies of 10 children (aged 3–11) in each country were undertaken. Qualitative methods used included observations in homes, schools and community spaces, interviews with children, parents, teachers and community partners, videos taken by parents, and Go-Pro camera footage taken by children. Parents also collected and shared the photo and video data. In addition, focus group discussions were held with children aged 5–11 in schools. Data were analysed both inductively and deductively, the latter approach using a range of pre-existing frameworks including the LEGO Foundation LtPET research instrument to evaluate children's play experiences, as observed by adults. To meet the project's objectives, children's digital play ecologies were studied in homes, communities, and schools in terms of synergies, dissonance, and transfer, and to identify the implications for learning. The relationship was considered between children's everyday use of technologies and the roles of adults in facilitating children's playful learning with technologies across a variety of contexts. Finally, the implications of the study were identified for the toy/children's media industry, for policy on parenting advice and guidance, and for the development of educational policy and practice (see Marsh et al. 2020). The full research report was not only published in English, but also translated into Afrikaans, and the summary reports also in isiZulu and isiXhosa.

The main objective of the research project was to evaluate play with technology as part of learning in a variety of cultural contexts and it was for this reason that an experienced researcher in South Africa was approached and invited to lead a project that mirrored the UK project, although it was never the intention of becoming a comparative study. One important exception to the relatively independent nature of the two studies was the use of the same basic mixed-method research design, because of time pressure and the fact that it was the first study of its kind in the South African context. As it turned out, minor adaptations and modifications were necessary as the study progressed. They were important changes though and had to be made to reflect the realities of the South African context. Central to this article is a constructive reflection on these changes, their importance for future research and the geo-political and socio-cultural reasons for their necessity. We will now focus on the details of the research design that mattered significantly in terms of this Global North/South research collaboration. These details in turn will inform the discussion of the three findings that draw attention to the operation of socio-cultural conditions and geo-political realities that influence what it means to research children's play across different contexts. We would argue that perhaps these insights were more important than the insights we had about children's digital play itself.

Research design

The data collection in South Africa was undertaken in four stages. First, a qualitative study was carried out with a small group of child participants at their schools, homes and communities (e.g., an afterschool club, or library). Secondly, focus groups were conducted with the case-study children

together with their peers in class. Thirdly, a quantitative study was conducted with parents in the local community. Fourthly, thirty carefully selected parents from these surveys were selected for a follow-up telephone interview. This sequence differed from the UK study, because we had to consider the different school calendar and the conditions put onto researchers by the Western Cape Education Department (WCED).

Research is not permitted in government schools in South Africa in the fourth term of any calendar year that runs from mid-January to the end of November (unlike the UK). This meant in practice that all data collection in the schools had to be completed before the last week in September 2019. In the UK, however, the project had started with the survey, then the work with case-study children, not the schools. This difference was significant, because the children in SA were mostly selected by the teachers and not the researchers. The fieldwork of both projects ran simultaneously, but mostly independent from one another. We now explore the stages of the research intervention in more detail and describe some of the challenges that emerged. We describe how we solved some of them and discuss the complex digital inequalities involved. The reality of the digital divide was important in the design of the survey. We hope that these insights can contribute to discussions about research designs for similar digital education projects in sub-Saharan Africa.

Research sites

In Stage 1, six primary schools in Cape Town and one pre-school in Johannesburg were approached through established networks to select the ten case study children for the qualitative part of the study. These schools were either university partnership schools, or schools in which former student teachers were now practising teachers, which constituted non-probability sampling. Thus, professional relationships prior to the study had already been established. As a result of this selection process, three of the teachers in Cape Town were familiar with enquiry-based approaches to teaching and learning through their pre-service or in-service training. Two of the case study children were in a non-government pre-school in Johannesburg (birth-to-five care is not freely provided by the state and the Grade R year was only recently added to formal primary education). They also constituted a convenience sample in that the family was known to one of the researchers through previous PhD research and offered an opening into a particular demographic.

Schools were selected across the various quintiles that reflect the socio-economic status of the surrounding community in which the school was located (Kabi 2016; Sayed and Motala 2012). In post-apartheid South Africa, equitable dispensation that aimed at redress in the education sector meant that there were funding opportunities across various provinces to facilitate the distribution of resources in schools across socio-economic groups. To this end, national policies were shaped to accommodate provincial poverty quintiles that ranged from one to five (Sayed and Motala 2012). This works along a continuum, from quintile 1, within which schools reflect the poorest 20% of children, to quintile 5, within which schools reflect the 20% of least poor children. In 2006, a 'No fee policy' was adopted, and schools which fell in the lowest two quintiles were exempt from learners paying fees. In 2009, the no-fee schools were broadened to quintile 3, ultimately prohibiting schools in quintiles one to three from charging school fees (Bell and McKay 2011). Of the seven schools included in the study, most were in the lower quintiles. One school dropped out, just before the home visits were organised (as explained in Marsh et al. 2020, 70).

The researchers

Two factors were prioritised in the recruitment of researchers in SA. Firstly, their academic expertise and experiences (early childhood education, educational technology, teaching, teacher education etc.). Secondly, several members of the team either worked or lived (or both) in the marginalised communities included in the research. These factors were an important consideration in the data collection because of the intersectional nature of gender, race, language and class in the

South African context and the fact that racialised demographies still exist in the 'post-apartheid' context. Researchers who participated had access to communities and could be considered insiders in those communities. Capacity building was also a consideration, affording opportunities for data collection to new doctoral students and three visiting postdoctoral fellows from Brazil. In total, four researchers and five research assistants worked with research coordinators who met regularly on WhatsApp and other virtual spaces (e.g., *Skype* reading group meetings). Also, three two-day workshops were organised to support the communication and deliberations across the teams and to write the report together. In this collaborative space, most important decisions were negotiated and decided upon. This set-up also made it more likely for the research team to notice the transfer of children's learning across various contexts, such as school, home, community, or other settings. Researchers also worked closely with the transcribers. The video and audio dataset are substantial and only relevant data was transcribed (and, when appropriate, translated) when directly relevant for answering the research questions. All transcripts and observation notes were coded, mostly using NVivo software.

Stage 1

During Stage 1, the research coordinators contacted either the principal of the school or the teacher. The Principal Investigator (PI) of the South African component also visited most of the schools at this stage and explained the purpose of the research to the principals, who selected the teacher(s) who would be most interested and/or had the time to be involved. The teachers, in collaboration with the researchers, in turn, selected the 3–11-year-old children for the case studies, as well as the children for the focus groups in the primary schools. The nine families were diverse in terms of income, the sample consisting of no-income and low-income to middle-income families. Although most of the parents had some form of income, some families relied in part on social support grants. The racial and ethnic heritage backgrounds of the families are outlined in pen portraits of each family, located in Appendix 2 of the report (Marsh et al. 2020). The families were visited 4–6 times over a two-months period. Parents and children were interviewed. Children's digital and non-digital play was recorded. The South African parents also filmed and photographed their children using cell phones. The children communicated with the researchers through WhatsApp groups and voice notes. In addition, some children were given the option to use diaries to record their use of social media and television and used wearable cameras to record their digital play. Further, the children were observed in schools in terms of how they used technology. Some children were also observed in a regular after-school club or public spaces they visited in their community. In many suburbs, safety issues, infrastructure and parents' financial resources prevent children from taking part in out-of-school activities which constrained this aspect of data collection, so the decision was made to use after-school clubs if children attended them.

Stage 2

In Stage 2, focus groups were conducted in five primary schools. The children completed collages and concept maps. In addition, children were invited to build a toy they would like to invent using a variety of media, including playdough and LEGO bricks. No focus groups were conducted with children in the sample who attended pre-school. However, visual diaries were specifically used at home with the younger children, the use of which proved to be very generative in catalysing rich research conversations about the children's conceptual engagement with their play practices. In line with the current shift of education in South Africa to accommodate transgender practices[7] and to move away from discriminatory practices that require children to identify themselves as either boy or girl, no table is included in the report with an overview of children's gender and age of the children.

Stage 3

In various ways, and as was to be expected, the methodology and especially the quantitative data collection were affected by South Africans' lack of access to digital technology. In the UK, a survey was administered online, but in SA it was completed face-to-face with parents of 3–11-year-olds in the locality of the schools. Field researchers were recruited to conduct the survey at carefully chosen sites, assisting respondents by explaining the questions and sensitively considering parents' home languages and literacy skills. We discuss the significance of this under Finding 1. Each field researcher captured their own data using the same survey link. Also, in consultation with School Principals at the participating schools, survey booklets were given to learners for their parents to complete. The booklet had a URL to the survey which parents could use. If done manually, the booklet was returned to the school via the child, but this approach was not effective. Few were returned, so an alternative had to be sought which we discuss below.

In the end, the survey was completed by 1286 respondents[8] which comprised 46% Black[9] African, 32% Coloured, 15% White and 6% Indian. Each respondent represented one child with parents identifying the gender of their child: girls (43%) and boys (46%). In terms of age, 76% of the children were between 3 and 7 years of age, and 44% were between 8 and 11 years old. Almost 90% of parents were comfortable using non-digital toys (Marsh et al., 2020). This was corroborated with another question. During weekdays, almost a third of children played with non-digital games for 2 h or more (29%) as opposed to a combined total of 14% who spent playing for the same duration with digital games (i.e., electronic toy, game console, smart toy, media player, smart speaker). Most parents (80%) perceived play as essential for children's learning and development. What we learned from the survey was firstly that children's play and learning with technologies are highly influenced by where they live. Secondly, the use of technologies for creativity and learning depends on the family's economic situation and parents attitudes to play with digital technologies. Thirdly, SA parents appeared to be able to recognise when their children were displaying the characteristics of playful learning, such as being actively engaged, with the play being joyful, meaningful, iterative, and socially engaging. Fourthly, play with digital technologies supports children in taking initiative and following what happens, but is more conducive to children owning an experience, setting their own goals and doing things they have not tried before (Marsh et al. 2020). Despite racial inequalities, there was uniformity in parents' view in SA that digital play fosters learning and development in children. Parents in SA were more likely to state that technology is important for success in education and life (65% v 56%). This is an important finding. It is well established that parents in resource-constrained communities see education as a way out of poverty. A possible interpretation of the finding is that parents in resource-constrained communities may exhibit more favourable attitudes to children's engagement with technology because they view it as a way of supporting their children's future financial well-being. These parents may, therefore, encourage children to play with digital technologies for this reason.[10]

Stage 4

In Stage 4, telephone interviews were conducted with 30 parents of children aged 3–11. These were recruited by asking for volunteers from those families who completed the survey. The names of the parents who completed the interview were entered into a draw to win a wearable camera – the same draw set up for the survey. Families were carefully chosen to ensure diversity in terms of social class, race, and ethnicity. Initially, 10 families had been selected whose home language was isiXhosa, 10 Afrikaans-speaking and 10 English-speaking families, but in the end, only 13 isiXhosa telephone interviews were completed (and subsequently translated) and 17 in English.[11] Interestingly, parents with Afrikaans as their home language, preferred the interview to be conducted in English when given the option by the interviewer. Therefore, whilst the study provides a range of rich insights into the digital play lives of children in SA, further research is needed that focuses more specifically

on the linguistic aspects of researching digital play during all stages of a study of this kind. We will now discuss linguistic diversity and other dimensions of this study. Some of our findings point at the deep inequalities between the Global North and the Global South and one aim of this paper is to add to the literature on digital inequalities[12] to inform further research of this kind in South Africa, and Sub-Saharan Africa more generally.

Finding 1: access to technology

In retrospect, we now realise that the lack of access to technology in South Africa needed to play a bigger role in how the research had been designed. Throughout the running of the project, the geo-political context[13] triggered deviations and exceptions from what we tend to take for granted in educational research when we use concepts such as 'home' in research design. At the same time, although changes needed to be made to the research design, it was still essential that the datasets could be considered meaningfully in relation to each other. For example, many children might have had access to technology, but not necessarily access to the internet (Phokeer et al. 2016). The notion of 'access' is often used to indicate children in resource-constrained environments' disadvantage (see, e.g., Dyson 2019). Given that the notion of 'access' is deceivingly complex, it is discussed in more depth below.[14]

Firstly, in Stage 3, lack of internet access via mobile or Wi-Fi networks meant that the survey in SA could only be conducted with about half the quantity of families in SA (1286 in SA as opposed to 2429 in the UK) across the geographical area that comprises Cape Town and its surrounds (called the Cape Flats). Mobile internet is highly expensive in South Africa (Moyo and Munoriyarwa 2021) and not often available for all parents, and the questionnaire was long. It took on average around 20–30 min to complete. But we wanted to include in our survey the same demographics as the children we had studied in the qualitative part of the study, and we knew that on-line access would not make that possible. Thus, we had to find a solution that included the views of parents living and working in the areas of the research, not just sample the experiences of parents across South Africa. So, what did we do?

We printed the survey and recruited student researchers to help respondents to complete the survey in person.[15] This was also important for other ethico-political reasons. The multilingual reality of South Africa needed to be taken into consideration. English is not a majority language in the Western Cape (Afrikaans is) and the survey was in English. Only approximately 10% of South Africans speak English at home.[16] The home languages of the student researchers represented the majority languages most spoken in this province: Afrikaans, isiXhosa and English. We were also mindful that approaching individuals to invite them to participate in a survey in public spaces was going to be a severe challenge and could also put female student researchers at risk. Violence affecting women in South Africa is estimated to be 5 times higher than the global average.[17] Moreover, strangers are often met with suspicion, especially when they are also black, as was the case with most of our student researchers. So, we decided that all student researchers should wear clearly identifiable T-shirts with a project label and a URL printed on them. This meant that, in principle, the credentials and legitimacy of the survey could be checked through the URL.[18]

The survey was administered to parents at various places where parents took their children to play, and these included the schools that participated in the project, as parents waited to fetch their children at the end of a school day; shopping malls; parks; beaches and other spaces where parents observed their children play. The survey was conducted in November and the dry and warm weather in the Western Cape greatly facilitated the data collection. Also, the incentive of the possibility of winning a wearable camera of a well-known brand when completing the survey helped to recruit interest. Offering money instead to research participants (as per the UK study) was against policy and regulations at the University of Cape Town.

The survey not only raised challenges associated with race, gender, language and connectivity, the SA team also had to carefully adapt the content of some of its questions that were felt to be

appropriate in the UK but were not in South Africa (see below). We were mindful of the local communities' deep economic and social inequalities and how different this was in the UK. Importantly, the geo-political obstacles we faced, and how we solved them, remain invisible in the number of responses we managed to generate and the time and academic effort it took to generate them. Attempts to assess the success or significance of the quantitative study in numeric terms alone (1286 responses in SA; 2429 in the UK) hides the complexity of conducting this survey in South Africa.

Secondly, the notion of 'access' is also problematic in terms of the digital environments that tend to be predominantly White, Northern and Anglo-normative (Prinsloo 2019). The many examples of games children referred to in the research are largely developed in the West and the global North and these Western, masculine narratives[19] are alien to African childhoods.[20] For example, in a systematic review article of 49 papers published in three scientific databases between 2000 and 2018, Lopez-Fernandez et al. (2019) found that women 'featured less than men on game covers and that when they were featured, this was in a highly sexualised manner with exaggerated bodies, particularly regarding size of breasts and buttocks and slimness of waist'. Some authors even suggest 'that women were represented as sex objects rather than actual characters or avatars for gamers. These studies noted that positive portrayals were rare and weak within a presentation, which may further discourage video game use among women. Indeed, this may detract from how women interact with gaming culture'. These studies show how ingrained masculine discourses are mostly naturalised and often go by unnoticed as is clear in an example taken up in Finding 3 below. The countering of the dominant masculine, Western digital games currently on the market is critical for gender equality and inclusive, equitable education.

In sum, even where children in SA had material access to digital games, they did not have access to digital games that connected meaningfully with their own experiences.

Finding 2: the geo-political contexts of children's play with technology

Thinking about the ways in which research designs are not neutral, but always implicated in assumptions about race, class, geo-political contexts, western orientations to knowledge, and in the case of this project, socio-cultural literacy research practices, we examine the research instrument with this in mind. Most educational research is carried out in the West. The literature seldom reflects African childhoods (Penn 2005) or tensions between global norms, privately funded research, and local contexts (Kjørholt and Penn 2019). It is therefore not surprising that not only the survey, but also the interview questions required some revision to reflect the realities of South African families, given that all the research tools adopted by the SA team had been devised with the UK context in mind. For example, most families in South Africa use public transport, therefore they were not asked about car ownership. Socio-cultural and other factors had to be considered for the focus groups, home visits and classroom observations. The inclusion of home visits as part of research is something that needs to be handled with great care. In two of the families, unemployment was a reality which made researchers erase questions regarding qualifications, careers, and employment. An assumption was made that home visits would include tours of children's homes to show the technology children play with. While possible in the UK, this does not consider the fact that some South African participants live in one-room homes in informal settlements or homes where lounges double as bedrooms. Asking for a tour through someone's home and recording this with expensive devices is intrusive and does not take the spatial and economic complexities of the family homes into account. In several homes, children were not asked to show researchers around their house and questions related to the use of digital devices in bedrooms were removed.[21]Discussions were held in inside or outside spaces families were comfortable with.

Wearable cameras are popular research instruments in the North[22] (Harwood and Collier 2019; Caton and Hackett 2019), but their use is of concern in some of the communities where the study was conducted. We hope that the detailed descriptions help future researchers working in resource-

constrained environments as the literature tends to take Western socio-economic and geo-political contexts as the norm. As we found out, leaving an expensive camera at home with children who live in areas considered to be dangerous, put the safety of the child, the family and even the researchers at risk. Thus, our decision to change the research protocol and not to work with wearable cameras (except during the researchers' visits) in one of the case studies comes not only from what we can call methodological sensitivity, but also ethical and legal concerns about the safety of people involved. In a further case, that of one of the schools, where two participating children attended, researchers were faced with the politics of leaving a GoPro in the home of one child and not the other. The participating children observed this and questioned the difference in treatment. It is necessary to understand how research affects and can affect the community being investigated. Keeping children safe by not giving them access to technology replicates the reality of the digital divide in Africa and, unless culturally sensitive, altered, or alternative methodologies are deployed, risks silencing the experiences of these children in the Global South. It is not that they do not have stories, it is that our instruments, shaped by assumptions about material resources, perpetuate inequalities.

Finding 3: children's seamless play between the digital and non-digital

Despite the lack of access to technology and data, the racial, linguistic, and other related deep inequalities, and the cultural differences in the way childhood is conceived in SA, the qualitative data show a wide range of examples of creative play. The flows of digital play across home, school and community varied in both sites. In the Cape Flats, safety issues, infrastructure and parents' financial resources prevented children from taking their playful learning with them easily from one space to another. There was little use of digital technologies in many of the community spaces and after-school activities children attended, and so to a large extent, it was schools that offered children opportunities to build on their digital interests outside of the home. However, children had few opportunities to take their own digital play practices into schools, apart from two schools in the Children, Technology and Play (CTAP) project that successfully engaged with children's home practices. Nevertheless, we show through an example below how it is possible to analyse children's digital play in resource-constrained environments in such a way that it troubles some pervasive binaries in educational research – in this case, the digital/non-digital, online/offline. This brings to the fore the capabilities, resourcefulness, and resilience of South African children even when they do not have access to Wi-Fi.

> Twins, 'Della' and 'Linton', aged 5, are two of the ten 'case study' children. They have an older sister 'Bongi' (9). The family has a PlayStation and a large collection of PS3 games including the LEGO Harry Potter, LEGO Marvel Avengers, LEGO Batman, LEGO Superheroes, WWE, Gran Turismo, Sonic Unleashed, and FIFA soccer games 2010, 2012 and 2013. The PlayStation games are generally played in pairs, so the three children have to take turns. They switch players every 10 min, sometimes using a rhyme ('Biti biti bota') to decide who takes the remote. Della and Bongi enjoy playing WWE SmackDown, choosing young female wrestlers as their players. During one home visit, Della plays WWE SmackDown with her older sister, Bongi, while wearing the chest harness and camera (see Figure 64, Marsh et al, 2020). None of the children's games are played online. Apart from PlayStation, the children have toys like Barbie dolls, remote-controlled cars, and the remains of a small LEGO set. Drawing is also an activity the children enjoy, and this meant that they responded enthusiastically to the suggestion of making visual diaries as part of the research.
>
> Contrary to the expectation that the 'diaries' would be a place for the children to represent their digital play, the diaries became 'play spaces' in themselves. The narrative drawings that the girls created in parallel (in their own diaries) were made as multimodal creations that included conversations, stories, clothing designs, challenges, and secrets. The girls' interest in the wrestling game centres on the fashion and performances of the young women wrestlers like Eva Marie, Nikki and Brie Bella (twins), and Alexa Bliss. Their drawings include asymmetrical hairstyles and funky outfits including elbow-length gloves, capes, and boas. In a spontaneous game of secrets and guessing, Della held us in suspense as she created a mystery object that eventually revealed itself as a pearl-encrusted glove. 'Thinking-with' their digital avatars, the young research participants showed

Ouch!
Boo
Boo
Boo

for researchers is: how can we capture divides and frame them in an additive way as opposed to deficit framing?'.

After the completion of the CTAP study, racial, gendered and economic inequalities have been further exacerbated by the COVID-19 pandemic, which has increased reliance on e-learning (Hood 2020) and access to the latest information, with physical social networks destroyed (Rogerson 2020). This imbalance has implications for: health and safety, conceptions of child agency (Murris 2019), availability of games, access and engagement with technology, and social relationships that promote Western models of play, framed by sets of binaries that fail to capture the complexity of children's play in Southern settings. In this paper, we have foregrounded some of the challenges we experienced as a research team in the hope these are useful insights for future research projects of this kind in sub-Saharan Africa. Although of course the joint project never intended to exclude and marginalise South Africans, a complex combination of factors that are nonetheless commonplace in contemporary academic research (e.g., the length of the project and preparation time, the amount of data that needed to be collected, different academic calendars, illness) exacerbated the challenges implicit in researching children's digital play across diverse geo-political contexts. It is vital that educational research in the Global South avoids the deficit framing engendered by a focus on disadvantage (Dyson 2019). What we learned is that digital play research in this part of the world is improved when its design and methods begin with what children do have.

It is important that future research projects build on existing technological infra-structures. For example, 75% of sub-Saharan Africans use mobile phones to communicate information and the CTAP project revealed that they are the most popular play device (Marsh et al. 2020). It therefore makes sense that any follow-up study includes the use of free mobile phone apps that can be used for learning through play that is also off-line. This needs to take account of the ways in which children's multilingual resources are developed through multimodal interactions that move beyond the dominant modes of reading and writing in print in many African schools. The use of locally produced apps can help with 'access' to technology as discussed in Finding 1, in that the long-term aim of developing them will challenge already available digital games and transform existing gender roles and racial stereotyping as materialised in the existing games available in sub-Saharan Africa.

Western research practices in early childhood and the conditions that make them possible tend to be hegemonic and the standard by which research findings elsewhere are judged (Dahlberg and Moss 2005). It is imperative that global education researchers ensure that any deviation from the Western norm is not regarded as 'being less' or inferior (cases of social and epistemic injustice, see Murris 2013). We conclude that the three findings confirm the widening of the digital divide. The discrepancies in terms of access to technology, the prevalence of Western, masculine narratives in digital games alien to African childhoods, and the ways in which South African children's play moves between the digital and non-digital, are shaped by material access and social contexts, highlight some of the structural digital inequalities between the South and the North. Although not a comparative study as such, it was through the different socio-cultural conditions and geo-political realities that much was learned about what it means to research children's play across different contexts, perhaps more so than about children's digital play itself.

Notes

1. For the full report see: https://cms.learningthroughplay.com/media/rkzfgydz/children-tech-and-play_full-report.pdf
2. For the South African project and the team, see: http://etilab.uct.ac.za/lego/
3. See: https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018. We also complied with the European GDPR and the Data Protection Act as set out by University of Sheffield (https://www.sheffield.ac.uk/govern/data-protection) as well as the University of Cape Town's own Information Security and Data Protection Policies. Moreover, consent was given by the School of Education Research Ethics committee.
4. For the LtPET rubric, see: https://learningthroughplay.com/learning-through-play-experience-tool

5. For the White paper, see: https://www.legofoundation.com/media/1063/learning-through-play_web.pdf
6. See also:https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01124/full
7. See, for example, https://www.dailymaverick.co.za/article/2019-06-04-transgender-learners-make-inroads-in-reshaping-rigid-binaries-in-schools/.
8. See: https://doi.org/10.25375/uct.11950107.v1
9. Rather than being assigned a racial category as had happened during apartheid, post-apartheid bodies are now choosing their own designation, whether that is "Black", "Mixed Race" or "Coloured". The latter term is controversial but proudly used by many in the Western Cape to identify with a rich culture. South African people of colour use the terms "Black" or "Coloured" to describe themselves or refuse racial categorisation. The nomenclature differs from that in the US.
10. For more details see Marsh et al. (2020, 54–55).
11. These interviews were transcribed and are stored (open access). See: https://doi.org/10.25375/uct.12017010.v1
12. As crucially linked with other social and material inequalities, it is striking how little the phrase digital inequalities is used in the literature. For its absence, see e.g. *The Routledge International Handbook of Learning with Technology* in Early Childhood (2019). For an interesting special issue on the topic, see: Robinson, Ragnedda, and Schulz (2020).
13. South Africa is a society that is deeply divided. Currently, it is the most unequal society in terms of the Gini coefficient.
14. The main objective of this paper is to describe the project, some of its obstacles and challenges and give a flavour of some important findings that are intricately related through the concept of 'access'. In future writing each finding will be explored in more depth.
15. In SA, most poor, unemployed, and semi-employed people participate in a complex informal economy, in some cases including illegal activities. Suspicion, and a lack of openness is sometimes the result. The visiting of homes in SA is therefore controversial and stopping people at random in public spaces for surveys can be misconstrued and can invite hostile responses. It was therefore necessary to make sure that all interviewers were clearly identifiable as discussed in this section.
16. See the following website for an overview of the languages spoken in South Africa. https://southafrica-info.com/arts-culture/11-languages-south-africa/. See also: http://www.statssa.gov.za/publications/P0318/P03182019.pdf
17. https://www.reuters.com/article/us-safrica-women-violence-idUSKCN1VO20F
18. http://tinyurl.com/2019legosurvey
19. Digital gaming culture is a rich area of research in gender studies. See e.g., Perreault et al. (2016). Doctorate research analysing gender in the commercial production of digital games, reveals entrenched rituals and material practices that exclude women by producing and reproducing such stereotypical discourses of masculinity by digital game workers (Johnson 2010).
20. Indigenous games are not represented in Western digital games (Nxumalo and Mncube 2018) and might risk extinction.
21. Four of the participating children live in one-bedroom apartments with their families, with spaces often being used for multiple purposes (lounge as bedroom, lounge as classroom) (Marsh et al. 2020)
22. We are not discussing here the often unquestioned and controversial idea that a wearable camera offers a close view of a child's world. See the claim made in Harwood and Collier 2019, 56.
23. See e.g., https://www.youtube.com/watch?v=Gl5KcBTHkf4.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by LEGO Foundation.

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