

'It's like a compass which I use to find direction': Findings and learning from an evaluation of an App designed to support the teaching of reading comprehension in rural and township schools in South Africa

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Abstract

South Africa has low literacy levels and teachers face multiple challenges in their endeavours to elevate levels of literacy. This is especially prevalent in rural and township schools where teachers face the additional challenges of isolation, limited resources and access to professional development. This article reports on the findings and learning from a preliminary research study which piloted a handheld mobile phone App. This collaborative project, between a university in KwaZulu-Natal and one in England, aimed to support in-service and preservice teachers in rural and township settings to use the App to assess and match books to learners' (aged 9–12) stage of reading development in order to facilitate their independent reading and provide teachers with a range of strategies for teaching comprehension that could supplement other professional development available. In-service teachers ($n = 120$) and preservice teachers ($n = 93$) took part in this mixed-methods study. The main finding from the study was that whilst participants were positive about the App, many did not access the App independently. This article discusses the broader issues, including participants' foundational knowledge and literacy research participation considerations, that may have underpinned this finding in this collaborative Global North and South research.

Key words: reading comprehension, mobile App, literacy, teaching and learning

Introduction

Whilst the most effective approach to the teaching of reading is a contested area, scholars agree that the goal

of reading is to comprehend and so enable reading for pleasure and purpose (Tennent, 2015; Oakhill et al., 2015). The ability to read for meaning impacts on and is a prerequisite for future academic, economic and social success and is one recognised by governments around the world (Castle et al., 2018; Sporer et al., 2009). South Africa is no exception, with its government, schools and academics highlighting that without basic reading comprehension, learners are more likely to drop out of school and suffer the often-accompanying detrimental consequences (Taylor et al., 2008).

Researchers in both the Global North and South recognise comprehension as a complex construct, involving a range of cognitive and linguistic skills. These skills are integrated alongside the readers' knowledge of the world and understanding of how texts work and so is a dynamic and active process, requiring the reader to constantly adjust thinking as each new word, sentence and paragraph is read (Duke and Cartwright, 2021; Fatyela et al., 2021; Pretorius and Lephahala, 2011). The reader's knowledge of the world and text is situated in the context in which reading takes place and this further impacts on the meaning making process (Cekiso et al., 2022; Hogan et al., 2011). In addition, a teacher's pedagogic skill and knowledge further impacts on learners' acquisition and application of the skills and strategies required for reading comprehension (Cilliers et al., 2022; Moats et al., 2010). *Teaching* reading comprehension is therefore a highly complex and skilled activity, and this research focuses on the teaching of reading comprehension in rural and township schools in KwaZulu-Natal, South Africa (SA).

The research team, made up of 10 academics, five from the University of Zululand, in KwaZulu-Natal, and five from the University of the West of England, sought to address some of these challenges through this preliminary study funded by the British Academy's Tackling Global Challenge Fund. The Global North and South team of researchers had worked alongside teachers in one township in the years preceding the project and the teachers had expressed a desire for further pedagogic knowledge of the teaching of comprehension and approaches to matching books to learners' needs. The team designed a simple handheld, mobile phone App to support teachers to organise and structure their book collections alongside developing pedagogic knowledge. The App has four key elements:

1. A photo-text recognition function which calculates the text readability level. It does this by recognising each word in a photo of text, taken by a camera within the App. From this, the App uses a basic readability algorithm to calculate a reading age.

2. A guide to enable teachers to match a book to a learner's reading needs and interests based on the learner's stage of reading development and the teacher's professional judgement.

3. The App provides a range of pedagogic approaches for the teaching of reading comprehension. These address some key evidence based reading strategies: activating prior knowledge; vocabulary understanding; clarifying and asking questions; visualising; making connections; summarising; monitoring comprehension 'on the run' (Duke et al., 2021; Tennent et al., 2016) the development of fluency (Kuhn et al., 2010); and decoding.

4. The App also provides a range of possible 'next steps' in teaching for some commonly observed reading challenges that learners might face. Screenshot wireframes of the App are in Appendix A.

This article provides details of the initial findings from this preliminary and pilot evaluation of the App along with learning about the challenges in the teaching of reading comprehension experienced by participants.

Research context

There is a surfeit of literature on the historic and continued low levels of literacy, amongst South African learners (Mullis et al., 2017; Spaull and Pretorius, 2019; Spaull et al., 2016). Results from the Progress in International Reading Literacy Study (PIRLS) show South Africa as being ranked last out of the 50 participating countries (Mullis et al., 2007). To compound this analysis, it was shown that 78% of South African

learners were unable to read for comprehension in any language, inclusive of their home language, by the end of the fourth year of formal schooling (Combrinck et al., 2014; Howie et al., 2008; Spaull, 2016). In KwaZulu-Natal, the context for this study, 81.6% of learners did not reach the literacy benchmark. In a 2016 policy briefing, Spaull et al. (2016) reported that 41% of a sample of 1772 Grade 5 learners (children aged 11 and 12) were effectively illiterate.

Numerous studies have identified the multiple and complex reasons for this low attainment identifying poverty, limited resources, poorly qualified teachers and poor governance at schools, as significant factors amongst many (Fleisch et al., 2017; Manten et al., 2020; South African Human Rights, 2021). These factors are in sharp focus in rural (those situated in remote areas far from urban centres and often characterised by subsistence farming) and township schools (found in and around urban areas). The commonalities between both types of schools are poor resources, poor infrastructure and poverty. There have been a wide variety of intervention studies that have endeavoured to address the issues detailed in recent systematic reviews (Carter et al., 2023; Meiklejohn et al., 2021), but there is little evidence of interventions that have been effectively scaled up and out (Spaull et al., 2016), and so these have had limited impact on low attainment.

One factor that makes the teaching of reading in SA such a complex task is that whilst it has 11 officially recognised languages, English is the main language for learning and teaching from Grade 4 (Naidoo et al., 2014) and this is in a country where English is the first language of just 10% of the population (Howie et al., 2008). However, Pretorius and Klapwijk (2016) and Van Staden (2021) warn against misattributing reading problems primarily to language proficiency, by assuming that greater language proficiency will resolve reading problems. They argue that 'While language proficiency and reading ability are inextricably linked, language ability and reading ability are not synonymous' (Pretorius and Klapwijk, 2016, p.3). Cronje (2022) contends that it is not the language itself that causes the low levels of literacy but the curriculum requirement to learn to read in English and a home language simultaneously and the prescribed phonics approach for doing this. She identified that learning to read in African languages requires a different approach to learning to read in English: with African languages better suited to syllabic approaches and English to a phonics approach. Whilst there is an ongoing and vibrant debate about how and when English should be introduced to learners, if at all, with calls from policymakers for the decolonisation of the education system (Basic Education minister, Angie

Motshekga, 2021) for the present, English remains the Language of Instruction.

The teaching reading comprehension by preservice and in-service teachers

A recurrent theme in the South African research literature on literacy is the weak language competence amongst teachers. Taylor (2016) argues that this can be attributed to the legacy of apartheid and teacher training during this era. Studies of preservice teacher (PST) training reveal that the teaching of reading is often not a feature of teacher education programmes (Chetty, 2019; Klapwijk, 2015; Nel, 2012; Van Der Merwe and Nel, 2012). Poor comprehension levels in both home language and first additional language, even in the realm of literal understanding, further compound teachers' abilities in the teaching of basic reading skills that support comprehension. In addition, it is argued that little, if any formal comprehension instruction occurs in schools (Klapwijk and Der Walt, 2011; Olifant et al., 2022; Zimmerman and Smit, 2014).

South African scholars recognise, however, that teachers face the additional challenge of trying to teach reading comprehension with few appropriate resources. Pretorius and Mampuru (2007) liken this to playing football without a ball. Being able to have access to texts with appropriate challenge and interest and then having the skills to match these to learners' needs and interests, can support the teaching of comprehension (Allington, 2005; Clay, 2016; Fountas and Pinnell, 1999).

Technology and App use

Mwapwele et al. (2019) point to the exponential growth in mobile phone ownership and use in sub-Saharan Africa, making the reach and potential of mobile phone Apps to support education a promising area of study. Technology use in South Africa has the ability to reach rurally isolated schools as well as township settings, empowering teachers with a means to access knowledge and training (Mji and Mnguni, 2015; Rothermel, 2020; Torres and Giddie, 2020). However, the rapid developments in technology and its benefits are not matched, Mullis and Martin (2019) found, by teachers' readiness to incorporate digital technologies into practice, and little or no integration was found in many primary schools. As Ndemo and Weiss (2017) point out, the same inequalities and challenges that exist in the education system as a whole in South Africa are mirrored in the

access to, use and understanding of, technologies designed for the classroom.

With these multiple challenges in mind, this British Academy, Tackling Global Challenges funded study, sought to design and build a simple App to support in-service teachers (IST) and PSTs in assessing text complexity in English and provide pedagogical approaches to the teaching of the key strategies of comprehension.

The research question was therefore

Can PSTs' and ISTs' confidence and professional knowledge of the teaching of reading in KwaZulu-Natal, SA, be developed by their use of a mobile App?

Subsidiary questions

What are the potential barriers to professional development using the App?

What can an intervention using an App tell us about IST and PST knowledge and skills of the teaching of reading comprehension?

Methodology and methods

The study used a socio-cognitive framing of learning to read, identifying reading 'as an individual cognitive-linguistic accomplishment' that is necessarily socially situated and 'socially constituted' (Pretorius and Lephala, 2011, p. 3). The design of an App was an attempt to reflect the contextual challenges of rural and township isolation, that is, isolated from professional development opportunities, and addressing the need to make the most effective use of any resources that were available in school. The App content was developed by Computer Science Masters students in both England and SA (overseen by an industry consultant), following a systematic literature review of effective interventions in the teaching of reading comprehension in the context of SA (Carter et al., 2023).

Purposive sampling was used to recruit participants for the questionnaires. English teachers from the intermediate phase (teaching Grades 4–7) in three education districts were recruited through the research team's connections with school principals in these areas. Teachers in Grades 4–7 and PSTs training for these years were the focus of the study as these teachers are expected to teach and assess reading comprehension in English. It was noted that teachers often taught across a number of grades in this range.

Convenience sampling was used for the focus groups who were drawn from schools from two of the school districts who were part of the research project and who volunteered for a focus group visit by two of the research team (one from the English University and the other from the South African university).

PSTs, in their final year of training, were recruited from the research partnership university's teacher education programme. This group were finishing their university-based teacher training programme and were about to begin their final teaching practices, in rural and township schools. PST focus group volunteers were drawn from the cohort of students who had used the App during their teaching placement.

A mixed-methods study design was used with pre-App and post-App use questionnaires. Two hundred and thirteen participants completed the pre-App questionnaire before using the App. The participants included 120 ISTs and 93 PSTs. One hundred and twenty-four participants (PST $n = 54$ and IST $n = 70$) completed the post-App questionnaire after downloading and using the App. There were however only 50 matched respondents, that is, those that completed both the pre-App and post-App questionnaires (30 ISTs and 20 PSTs) whose answers could be matched pre-App and post-App use. Some participants only completed the post-App questionnaire having heard about the App from other PSTs or ISTs. This group had used the App but had not completed the pre-App questionnaire. The research team, whilst hoping to have matched data from pre and post questionnaires, were happy to have post-App use data as this supported the App development in relation to the Apps useability and evaluation. Some participants only completed the pre-App questionnaire, and the results section provides some reflections as to why this group did not complete the post-App questionnaire. The pre-App use questionnaire was designed to identify IST and PST confidence and knowledge of the teaching of reading, how to match books to learner reading needs for teaching and use and knowledge of comprehension strategy teaching approaches. A sample of the questions, to provide examples of the question types and scales used in the questionnaire, can be found in Appendix B.

The App was launched with teachers in three Districts in KwaZulu-Natal as part of existing school district training events and introduced to final-year PSTs as part of their pre-practice module with an encouragement by tutors to use the App during placement. The post-App questionnaire was designed to identify how the App had supported the matching of books to learners; its impact, if any on confidence, strategy instruction knowledge and to gather feedback on the App itself in relation to how it had been used; its ease of use; and the elements of the App that were most and

least useful for participants. Both questionnaires were dependent on self-reported data, and this was a limitation of the study (Ross and Bibler Zaidi, 2019) and will be explored in more detail in the findings section and reflection on the research process.

Three semi-structured focus groups with PSTs ($n = 24$) at one university and seven focus groups from across 10 schools with ISTs ($n = 32$) were conducted with three of the focus groups being made up of teachers from rural schools only and two with teachers from township schools only. The other two IST focus groups included a mix of rural and township teachers. The PST and IST focus groups were held to probe more deeply both the pre-App and post-App questionnaire data. Participant confidence and knowledge of the reading process was explored through the inclusion of open-ended prompts to generate discussion. The focus groups used a similar approach to elicit views on the design and ease of use of the App as well as the App's impact on professional knowledge.

The quantitative data were analysed using SPSS and the focus group qualitative data using NVIVO. Data were coded using NVIVO, and the following themes were generated: App implementation in South Africa the strengths and barriers; teacher (preservice and in-service) pedagogy and confidence; barriers within the teaching environment; teaching training; and development in reading. The App implementation theme will be explored in a further article.

Ethical approval was necessarily sought in both the English and South African research institutions recognising the different processes and priorities of institutions and the complexity of power relationships in research collaborations between the Global North and South. There was an awareness in the team of ensuring the project was not only collaborative but led by the knowledge of the South African academics and so avoiding what Martin (2008) identified as contemporary forms of imperialism.

Results and discussion

Whilst there were 213 pre-App use questionnaires and 124 post-App use questionnaires completed by PSTs and ISTs, there were only 50 participants (30 ISTs and 20 PSTs) who completed both the pre-App and post-App questionnaires that could be matched to compare pre-App and post-App use data. The matched questionnaires showed that there was no clear evidence of increased confidence in the teaching of comprehension following the use of the App or development of strategies for teaching comprehension. The whole dataset however did provide rich evidence about the more nuanced and complex picture of

participants' reluctance to admit that they had not used the App to those perceived to be more powerful, that is, those from the University in South Africa and their Global North partners.

As there was variation in the numbers of participants who answered each question, percentages and numbers of participants will be given in the findings that follow. Of the participants who answered the pre-App use question about their previous training in the teaching of reading, 75% ($n = 89$) of ISTs and 80% ($n = 74$) of PSTs said they had been taught how to teach reading; 62% ($n = 74$) of ISTs and 82% ($n = 75$) of PSTs rated this training as good or better; 74% ($n = 87$) of ISTs and 91% ($n = 83$) of PSTs said they had been taught how to teach reading comprehension specifically; 81% ($n = 93$) of the 114 ISTs who answered the question and 93% ($n = 83$) of the 89 PSTs said they felt confident or very confident to teach reading comprehension. These figures seemed surprising from a number of perspectives. The App had been designed as a direct consequence of requests from ISTs (across seven schools). The ISTs had outlined their need for more support with the teaching of reading comprehension in English and in particular teaching and learning approaches. In addition, the outcomes for learners across SA and in KwaZulu-Natal specifically demonstrate the very low levels of attainment for learners, as outlined in the literature review in this article. In the same way, there is a wide range of research that suggests teachers' level of subject and pedagogical knowledge of the teaching of reading is very low (Van Staden and Howie, 2012). Klapwijk (2015) outlined the lack of training in the teaching of reading for PSTs, and so it seems unlikely that the research participants would differ significantly from this general picture. It is possible that participants may have reported high levels of confidence and high levels of effectiveness of their training programmes because of conformity and prestige bias (Ruel, 2018). The team also considered if participant responses were an indication of difficulty understanding the English used in the questions. Whilst the team were a mix of UK and South African researchers, it is possible that participants did not want to reveal any professional development needs to those instrumental in their colonial past. It was also considered if the confidence levels could be legitimately high and that other factors mitigated teacher impact on attainment outcomes of learners. For example, class sizes may impact on outcomes with 76% ($n = 87$) of the 115 ISTs who answered the question and 34% ($n = 39$) of the 93 PSTs, reporting they taught in classes of over 50 learners. Another factor that may impact on outcomes (other than teaching quality) may be the opportunities to teach reading comprehension. 45% ($n = 51$) of the 114 ISTs and 46% ($n = 40$) of the 86 PSTs taught reading

comprehension only once a week or less (the PSTs whilst on placement).

The focus groups followed up these points about confidence. A typical response included:

E School IST

I would say I feel pretty much confident in teaching reading. I would give it a 9 [out of 10]. I think it's somehow simpler to teach reading with our kids ... most of our learners, they can read. Also another challenge would be reading for understanding. But teaching reading I would say for me in Grade 6 it's okay, it's good. Zanele

The assumption about reading here would appear to be that it is simply a matter of being able to decode the words on the page rather than reading for meaning, comprehension as essential. This seems to strike at the heart of the issues around literacy outcomes in SA: if a learners' ability to read with understanding is not the focus of how teachers reflect on their efficacy as teachers of reading, then teachers will continue to consider that there is not room for development.

Other ISTs focused on the complexity of home language and English reading.

Z School IST

I think it's because of the environment that we are living in. Letters are not required, so English is not our mother tongue ... so some of the learners always just ask me to switch it to their mother tongue. So that is why I wouldn't say 10 out of 10 [for confidence in teaching reading]. Thandi

The teacher is sharing the complexity of the interrelationship between home language and English as well as learners' home contexts. She suggests too that learners can decode in English but do not understand what is being read unless the teacher 'translates' to the home language.

Whilst the PSTs' questionnaire data showed a similar level of confidence with the teaching of reading comprehension, the focus group data were more varied, perhaps a reflection on an awareness that they were at the start of their careers. Where PSTs expressed high levels of confidence, it became clear that the PSTs were judging learners' reading comprehension skills on the completion of *language* comprehension activities.

I feel very confident because whenever I do the comprehension there'll be pictures so they can be able to visualise everything that I teach them. And sometimes, since it's a

Zulu school, I will teach them in English and then translate in Zulu for their better understanding. PST Joseph

I am confident but they are struggling when it is come to English. It is better when you are reading it in isiZulu for them, or we can read it in English then explain to them in isiZulu. PST Siphoh

PST Joseph and Siphoh do not seem to recognise that their approach was bypassing the children actually reading—either in isiZulu or English. This is consistent with Cekiso's (2017) study that found teachers tended to focus on oral reading rather than reading comprehension. The PSTs did not go on to suggest how they could build on the language comprehension that had been developed.

When asked in the pre-App use questionnaire what the greatest difficulty the learners had with reading comprehension, 44% ($n = 50$) of ISTs said 'learners cannot read the words'. This was echoed in the question asked about what would most support teachers to teach comprehension, with one teacher saying 'for the learners to be able to read'. This suggests that there are fundamental issues with the teaching of the basic skills and strategies of decoding and comprehension. With this in mind, only four ISTs identified decoding strategies as part of their teaching in the questionnaire.

Some questionnaire responses raised further questions about teacher subject and pedagogical knowledge and understanding, for example, one teacher said the approach used to teaching was, 'reading to them' and another teacher used 'silent reading' to teach comprehension and another 'listening to me read'. Whilst all of these approaches have a place in a menu of strategies, an understanding of what can be taught and how needs to underpin these, and this was not clear from the responses. Madikiza et al. (2018) noted that teachers did not seem to understand many of the comprehension strategies and this limited them to those they felt they did understand. It is possible the questionnaire responses were an example of 'you don't know what you don't know'. This was explored further in the focus groups.

PSTs said that one of the challenges they faced, was children who did not have enough experience of reading in English, to be able to decode at a basic level—even in Grade 5.

One of the problems to the learners that I was teaching on Grade 5 is that most of them are not used to reading, especially English, so the words that they just encounter by reading they found them unfamiliar in such a way that when they try to read it, they can't even spell [sound] it out. So it makes things very, very hard for

them even to visualise what that word might mean. PST Zuri

Botha et al. (2008) makes clear that this is a key issue as in teacher education. Only foundation-level teachers are taught how to teach reading. If a learner enters a Grade 5 class unable to read it is likely they will leave the grade unable to read, as teachers have not been equipped to teach them.

In contrast, other PSTs identified that children could decode, but did not understand,

That to me was a big challenge because some of them you find that they are reading but they cannot comprehend or if you ask them what are you reading about, they don't know what they are reading. But they are reading, so they don't read with an understanding. PST Ade

Whilst many ISTs said they were confident teaching reading, they were aware that children's written assessments did not demonstrate high levels of learning.

M School IST

In fact they do understand while we are interfacing with them. The problem comes when it's time for them to answer questions ... when it comes to writing, that's when I think all of us have the challenge when it comes to writing, and just doing this as a class activity they do that correctly. ... So in fact, I don't know whether our skills are on a par with their understanding. I don't know whether other educators have the same thing. But for me, I teach the very same thing that I taught them in Grade 4, I do it in Grade 5, but they do the same thing that they did in Grade 4. They fail to respond. Nomsa

With large classes being a challenge to teachers, it is not always possible for teachers to be able to check for understanding across a whole class. The feeling of exasperation is clear in this teacher's voice—teaching the same learners the same things in a following year and not seeing the progress she might expect.

Participants were asked how they had learnt to read, with 73% ($n = 86$) of 118 ISTs and 86% ($n = 79$) of 92 PSTs who responded to this question, saying they learnt using a 'look and say' approach. Twenty-seven per cent ($n = 32$) of ISTs and 36% ($n = 33$) of PSTs said they learnt to read by saying letter names rather than sounds. What is interesting to note is that 77% ($n = 91$) of ISTs and 98% of PSTs ($n = 89$) said they used their experience of being taught to read as a child to inform their teaching. Forty-two per cent ($n = 50$) of 120 ISTs who answered the question about length of service as a teacher said they had been teaching for over

16 years. This would suggest that these teachers had been taught to read during the period of apartheid or just after the end of apartheid, a time of major social, economic and educational injustice and inequality, necessarily impacting on the teaching quality and resourcing of schools. This is not however the case for PSTs who might have been expected to draw on their teacher education programme to inform their teaching. There seems to be little movement or development of practice over the years since apartheid ended, potentially building low attainment into the system.

In the focus groups, PSTs expressed concern that they were underprepared to teach reading comprehension.

We have concerns as teachers. You can't go to the field with a lack of knowledge of some things that you're supposed to teach the children, so we have concerns. PST Mandla

PSTs were aware that the issue of language was perhaps one of the greatest challenges they face. PSTs said that the learners they taught had often not mastered speaking, reading and writing in the home language in the foundation stages of their education meaning that even when code-switching in the later years, children could still not comprehend fully.

Of the 114 ISTs who responded, 65% ($n = 114$) and 41% ($n = 37$) of 90 PSTs said that books for learners were not categorised or graded in any way. Twenty-nine per cent ($n = 33$) of ISTs said that these books came from a published, graded reading scheme and 57% ($n = 65$) of ISTs saying they used their professional judgement to categorise or grade books. Sixty-six per cent ($n = 59$) said they would not know how to do this themselves or would be able to match a book to a child's learning needs. This might have suggested that the App's photo-text recognition design, which gave an approximate reading age of a text and then guidance on how to then match the text to the learner, may have been useful for participants. However, the post-App questionnaire showed that this was the least used part of the App, with only 32% ($n = 9$) of the 28 ISTs and 40% ($n = 15$) of 37 PSTs that responded using this part of the App.

One focus group task sought to explore this further and involved asking participants to order, in terms of reading challenge a range of books, whilst 'thinking aloud' as they did this, vocalising how they were making their decisions about text complexity. Two PST focus groups ($n = 16$) did this task without opening the books provided. They discussed the title, the genre and the 'thickness' of the book as well as the picture on the front cover but only when prompted did they look at the text in the book. When looking at the text,

the focus was on the subject of the text and the genre, based on the pictures or titles and sub-titles. It had been expected that participants may have considered these elements, but in addition, it might have been expected that participants would have analysed the vocabulary complexity in relation to meaning and morphology, syntax, text structure, themes and possibly cultural appropriateness. Having a grasp of the challenges a reader may face when reading a text is a key consideration when teaching reading comprehension.

The focus groups also explored the App function that gave pedagogical teaching ideas. This was the most used element with 75% of participants (PSTs and ISTs) who completed the post-App use questionnaire using it.

Typical PST focus group data includes:

To me, it's like a compass which I use to find direction on how to deal with such learners, such areas for learners, so to me this App is really helpful. PST Martha

It's actually helping us. We are still learning. PST Joseph

Z School ISTs

I can teach using those methods but it's the learners themselves, they are the ones that determine are they getting this, so that I can just keep on checking these steps. T Lindiwe

However, some of the participant responses were too generic to be sure the participant had used the App or were just responding to what they had been shown of the App as part of the focus group. Other positive responses were evidently responding to demonstrations they had been given, rather than based on their own App use.

There was an awareness in the research team that self-reported data in the focus groups was as problematic as the self-reported data in the questionnaire. It is possible teachers may feel their professionalism was under scrutiny. Without a strong culture of self-evaluation, teachers may feel that any indications of a need to know more professionally may appear as a weakness, particularly when talking to researchers from two universities.

Conclusions and future directions

Whilst the data from the research demonstrates that the App, in its current form and implementation, does not impact clearly on teacher confidence, pedagogic

and subject knowledge when teaching reading comprehension, learning from the evaluation process provides evidence of the foundations that need to be laid before the App can have impact. This adds to the body of knowledge about the challenges faced by SA in its efforts to raise attainment in reading. The team have also reflected on the role and legacy of Apartheid which still impacts, not just on the material circumstances of teachers in schools but also on the inequalities that are still evident across society. This in turn can impact on how teachers may view a research team from the Global North, despite it working alongside researchers from the Global South and despite the research springing from discussions with those same teachers. Msila (2020) would suggest a more radical, decolonising approach—with the involvement of the Global South being inappropriate, particularly in relation to language teaching and learning, teaching pedagogy and teacher education. These are aspects of development that should be delinked from past colonisers. Future research, at the very least, needs to ensure it includes not just researchers from the Global South but have a design that is more participatory and collaborative with the teachers it seeks to support.

It is clear to the team that the App can only have impact where it is implemented in tandem with reading and reading comprehension teacher education and professional development. The next steps are therefore for the South African team to begin to revise some of its teacher education modules, integrating the App so that it can provide the bridge between theory and practice and be the portable ‘tutor in a pocket’ for PSTs as they move between their teaching reading module at university to their school placement.

The goal is perhaps for more than one IST and PST to identify the App as a ‘compass’ for teaching and, so in some small way, support South Africa in the huge literacy challenge it faces.

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Author contributions

Jane Carter: Research design, lead researcher, fund holder (PI of funded project) and main author. Pravina Pillay: Research design, researcher, Co-I from South African partnership and second author. Tessa Podpadec: Research assistant (methodology focus) and contributing author. Jethro Gina, Nontobeko Khumalo, Ben Knight, Paul Matthews, Lindiwe

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Ethics statement

This project was approved by the University of the West of England, Arts, Creative Industries and Education Faculty Ethics Committee and by the Education Faculty at the University of Zululand.

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Appendix A

Figure A1 shows some of the elements available on the App and how they appear for the user.

Appendix B

Examples of question types used in questionnaire.

- How many years have you been a teacher/educator?
0–3 years 4–6 years 7–9 years 10–12 years 13–15 years 16 years or more
- When you were a child, which of these approaches was used to teach you to read in English? You can tick one or more of the following approaches if you wish:

1. Copying the teacher/educator as they read words from the board, e.g. the teacher reads 'cat' and the class chants 'cat'
2. Learning the sounds of each letter in the alphabet, in the order of the letters of the alphabet
3. Learning the sounds of each letter in the alphabet in order, starting with the vowel sounds
4. Being taught to use phonics knowledge to sound out words and then blend the sounds to read a word
5. Learning letter patterns in words, e.g. ack, and then adding a sound at the start, e.g. adding b to make the word back; adding a p to make the word pack
6. Saying the letter names (not the letter sounds but the letter names) and then saying the word
7. Other (explain)
 - When you were training to be a teacher/educator which best describes your experience of being taught how to teach learners to read in their home language?
Excellent Good Satisfactory Poor Very poor I was not taught how to teach this.
 - In your teacher/educator training which best describes your experience of being taught how to teach learners to read in English?
Excellent Good Satisfactory Poor Very poor I was not taught how to teach this
 - How many learners do you have in your class or classes?
0–20 21–30 31–40 41–50 51–60 61 or more
 - How confident do you feel in teaching learners to comprehend/understand a text – reading comprehension?

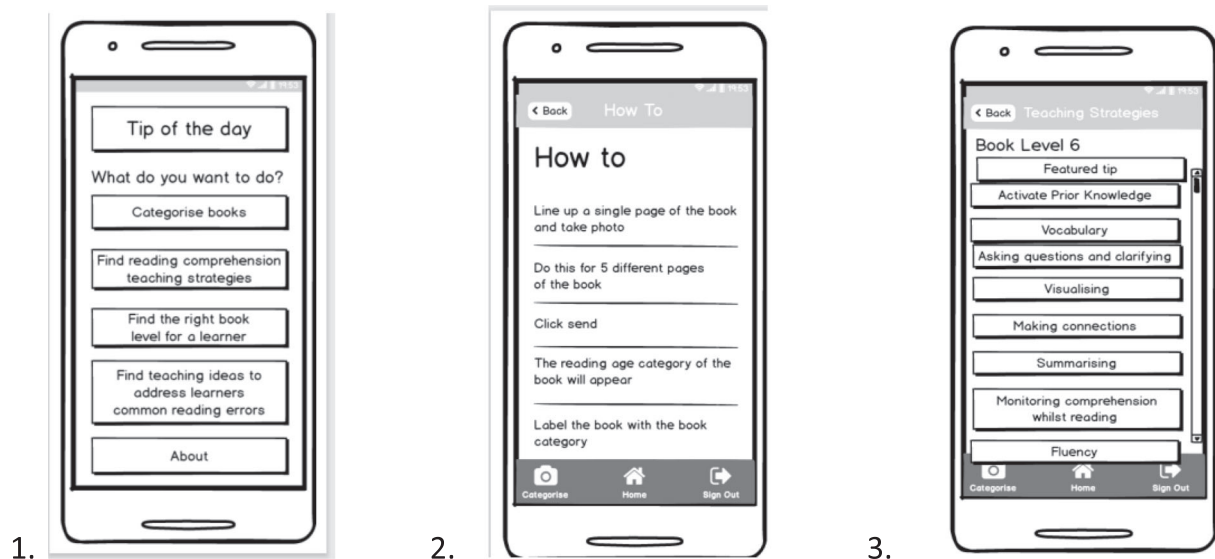


Figure 1: Wireframe 1 shows the landing page where teachers select the function of the App they wish to use. Wireframe 2 shows the guidance for teachers on taking the text photo to enable the calculation of readability and approximate reading age. Wireframe 3 shows how teachers can select a particular strategy they wish to teach. Once selected a range of strategies and approaches are shared.

Very confident Confident A little confident Not confident

- Thinking about learners in your class: What are the two things that they find most difficult about reading? Make sure you tick two things

1. Reading the words—knowing what the words on the page say (decoding)
2. Knowing what each word they read means (vocabulary knowledge)
3. Being able to understand what has been read and answer simple questions
4. Being able to use what has been read to answer inferential questions
5. Reading with fluency (reading with a good speed)
6. Other (please explain)

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