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## EXPLORING CHILDREN’S READING COMPREHENSION AND ENGAGEMENT OF PRINT AND EBOOKS IN KUMASI

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### ABSTRACT

Children born in the digital era are exposed to a variety of digital devices, including computers and portable devices. Consequently, children’s books are now in print and digital formats and on various electronic devices, giving young readers multiple platforms to engage with. It is, therefore, important to examine how young readers engage with and comprehend content in both formats. This study adopted a mixed-methods observational study with a convergent design, combining qualitative classroom observation with quantitative assessment of reading comprehension and engagement of content in print and electronic books. Thirty-two Primary 4 pupils from four basic schools in Kumasi, Ghana, were randomly selected, with eight pupils from each school participating in the study. The findings reveal that students demonstrated better reading comprehension and higher engagement when using print books compared to eBooks. This may be attributed to their greater familiarity with print materials, as print books are more commonly used in their educational environments. The study makes a case for the continuous use of print books in education in Ghana and not replacing them completely with eBooks; at best, both must coexist. The results accentuate the importance of tailoring reading materials and using the appropriate format to cater for the needs of students, while offering valuable guidance for educators and researchers in enhancing literacy experiences.

**Keywords:** eBooks, print books, reading engagement, reading comprehension

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## INTRODUCTION

Reading comprehension is a dynamic process involving an interaction between the reader, the text, and the act of reading. As readers engage with text, they integrate meaning with prior knowledge, drawing on personal experiences and motivation (Antoniou, 2021; Banditvilai, 2020). The language, structure, and genre of the text being read are all factors that affect the reading process (Andreani *et al.*, 2021). Reading involves decoding, semantic processing, and text understanding (Allen & McNamara, 2020; Duke & Cartwright, 2021). The medium through which text is read influences decoding, semantic processing, and understanding (Singer & Alexander, 2017).

The advent of digital technology has transformed the way people access, read, and engage with written content (Mirra *et al.*, 2018). This shift from print to digital media has raised important questions about its impact on reading comprehension and engagement levels. Reading is a requisite for the development of students' literacy, as it enables them to comprehend and formulate discussions within a language (Duke *et al.*, 2011; Syamsir *et al.*, 2021). Again, evidence suggests that both print books and eBooks can help develop reading skills and reading comprehension (Ronconi *et al.*, 2022).

With digital publishing impacting all levels of education, and the activities of students (Petrusevich, 2020), it is important to assess if children's comprehension and engagement levels vary based on the format in which they read - print or on-screen. Through their interactions with digital media at home and school, children are bridging the gap between technology and education. This exposure to digital reading—accessing and downloading eBooks online—indicates their growing awareness of the transformative impact of information and communication technologies (López-Escribano *et al.*, 2021; Ry-Kottoh, 2017).

Digital media offer certain affordances, like interactivity, but their use may not always aid reading comprehension and engagement, compared to print (Johnson & Ferguson, 2020). As digital texts become increasingly prevalent, it is crucial to continue investigating their impact on reading comprehension and engagement, to inform educational practices and policy decisions (Støle *et al.*, 2020). Research has shown that the medium through which text is consumed can significantly influence reading comprehension (Ronconi *et al.*, 2022). Some studies found that students who read texts in print scored better on reading comprehension tests than those who read digitally (Ben-Yehudah & Eshet-Alkai, 2021; Kazazoğlu, 2020; Støle *et al.*, 2020; Singer and Alexander, 2017). However, Mangen *et al.* (2012) noted that digital books with story-congruent enhancements could outperform paper books in terms of comprehension.

A systematic literature review, spanning 25 years, identified trends in research on reading comprehension across media and highlighted the lack of consistent definitions and measures of comprehension, and also pointed out the need for future empirical research to consider the importance of the medium in reading comprehension. (Macaro *et al.*, 2018). Other studies have explored the effects of processing time on comprehension and calibration in print and digital media (Singer & Alexander, 2017). These studies found that while students may read faster and feel more confident when reading digitally, their actual performance was better when reading in print. Similarly, Reich *et al.* (2019) revealed that pre-schoolers demonstrated better comprehension levels with print books than with eBooks. The effectiveness of the medium in promoting comprehension may depend on the context and age of the children, which may affect young children's motivation to read (López-Escribano *et al.*, 2018).

In comparing children's reading acquisition ability when using digital devices versus the use of traditional printed books, Neumann *et al.* (2017) revealed that eBooks and printed books served distinct roles in learning to read, offering unique experiences. While tablets may improve emergent literacy skills, they often require parental or teacher support; therefore, scaffolding is needed to maximise the benefits of eBooks. Furthermore, Reich *et al.* (2019) reported that well-designed eBooks are as effective as printed books in improving reading acquisition outcomes. A meta-analysis by Tackas *et al.* (2015) revealed that stories presented through multimedia can support and even strengthen children's understanding of the story compared to listening to stories in more traditional settings, such as storybook reading. Similarly, Singer and Alexander (2017) observed that students comprehended digital texts better than printed texts. However, in their comprehension tests, there was no difference across the media when the questions were asked to identify the main idea of the text. Similarly, other studies found no significant difference in comprehension levels between digital and print materials (Swanson *et al.*, 2020; Liman Kaban & Karadeniz, 2021).

Reading engagement refers to how readers interact with the reading material, content and architecture of the book. Despite the positive outcomes reported on eBook reading, some researchers have taken a more critical view of eBooks, citing how features like hotspots that contain animation and sounds may distract young readers and hinder comprehension of the story's main theme (Reich *et al.*, 2019). While some hotspots may enhance the content, others may not (Christ *et al.*, 2019). In this sense, an analysis of eBook design reveals that the first published digital books included hotspots that often had little or no relevance to the story and distracted children from language and literacy learning (Reich *et al.*, 2016). However, eBook designs have improved over the years as the number

of interactive features and hotspots has decreased. The hotspots are more congruent as they elaborate or extend the storyline (Korat *et al.*, 2019).

On reading print books, some parents reported that their children read and enjoyed traditional print books more than eBooks. Caregivers also reported participating in more *talk about the story* when reading print books than electronic books (Strouse *et al.*, 2016). Similarly, teachers sharing enhanced digital books struggle to define their roles. When sharing digital books, children may be occupied by the interactive features in the books (tapping hotspots initiates sounds, simple animations, and dialogue/sounds from the characters) while ignoring the story (Hoel *et al.*, 2019; Takacs *et al.*, 2015).

Data on the sale of books for 2021 in the United States of America and the United Kingdom show that print books remain a popular book format as they provide comfort and escape from the distress of the online world (Kahlon, 2023). Stead (2023) observes that technological advancements and changing lifestyles have led people to spend more time on screens for work, leisure, and entertainment. As a result, both young adults and senior citizens in the UK and the USA have developed a renewed appreciation for print books, valuing the unique intimacy and sensory experience they offer—something that digital media cannot replicate. However, many young readers in Ghana prefer eBooks over printed books, and eagerly await their introduction into the mainstream educational system because of its advantages: ease of access when the necessary infrastructure is available, the convenience of carrying multiple eBooks on one device, the capacity to access other media from the same device, and the novelty of interactive features (of enhanced eBooks) (Ry-Kottah, 2017; Takacs *et al.*, 2015).

This paper explores pupils' comprehension and engagement levels when reading both print and electronic versions of a book, as well as their preferences for eBooks versus print books. Given the significant advancement in computer use among school children, following the introduction of Information and Communication Technology in Ghana's basic schools, a study on how children engage with digital and print content is relevant and will contribute to the literature in the field.

This study was situated within the Simple View of Reading framework, which states that reading comprehension is shaped by two key factors: decoding and linguistic comprehension (Gough and Tunmer, 1986). This theoretical framework provides a foundation for understanding how readers construct and manipulate mental models during the reading comprehension process. Decoding is the ability to read words accurately and fluently, while linguistic comprehension involves understanding the meaning of the text (Duke *et al.*, 2021). By exploring the interaction between these components, the study investigated the level of reading engagement and reading comprehension in the Primary 4 school pupils under study.

The principle of engagement involves a combination of attention, interest and enjoyment, where children look, see, and listen while clearly enjoying the storybooks. The principle is centred in the broader, multi-disciplinary professional literature that distinguishes engagement from motivation. Engagement is believed to be more dependent on self-agency, or the power to take control and see the results of one's own decisions, while motivation depends on external agency. Individuals choose to be engaged; they are not told or assigned to do so. They engage when the books they read are interesting, socially useful or personally enjoyable to them and within their zone of close development (Roskos *et al.*, 2012).

In Ghana, reading comprehension remains a critical concern at the basic school level. While the introduction of Information and Communication Technology (ICT) in basic schools has increased pupils' exposure to digital tools, print textbooks remain the dominant instructional resource due to infrastructural constraints and unequal access to digital devices. As a result, pupils encounter both print and electronic texts in uneven ways, necessitating an examination of how these formats influence reading comprehension and engagement in the Ghanaian educational context. Therefore, this study seeks to explore how primary school pupils in Kumasi engage with and comprehend print and electronic books, to provide empirical evidence that can inform instructional practices and decisions regarding the use of reading materials in Ghanaian basic schools.

## **MATERIALS AND METHOD (METHODOLOGY)**

The study adopted a mixed-methods observational design that integrated qualitative classroom observation with quantitative assessment techniques. While a structured reading comprehension test was administered and scored to determine pupils' levels of understanding, their reading behaviours and engagement were observed in a classroom setting and scored based on measurable indicators for comparison across reading formats. Integrating qualitative observation and quantitative measurement enabled a comprehensive analysis of both the experiential and performance dimensions of reading. Four basic schools in the Oforikrom Municipality in Kumasi were conveniently selected due to their proximity to the researchers: American Educational Complex, Victory Baptist School, Elite International School, and KNUST Basic School. Ethical approval was sought and obtained (HuSSREC/AP/202/Vol 4) from the Humanities and

Social Sciences Research Ethics Committee of the Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. Permission was obtained from the headteachers of the schools, and parental consent was secured for all participants. In each school, 8 pupils were randomly selected by the class teachers in each participating school to ensure a heterogeneous outcome.

Data was collected from thirty-two Primary 4 pupils within the ages of nine and eleven, from the four basic schools selected in two phases. A comprehension test was conducted after the pupils read the print and electronic versions of *Ayisha*, written by Lawrence Darmani. During the reading sessions, the researchers observed and assessed the pupils' engagement with both formats of the book based on a protocol that included ten behavioural indicators of reading engagement: physical behaviour, interaction with the text, verbal responses, emotional reactions, reading speed, enthusiasm, focus, story recall, desire to continue reading, and personal connection to the text, (Rokos *et al.*, 2014) with each indicator scored out of 5 to determine overall engagement levels. The comprehension test was carefully designed, considering factors like text complexity, question validity, and reliability by consulting teachers in various schools. This design was considered appropriate because it allowed assessment of the pupils' reading comprehension and for an in-depth observation of pupils' reading behaviours within a natural classroom setting. To allow for a systematic comparison of pupils' engagement and comprehension across the two reading formats, data collection was organised into two sequential phases, as described below.

#### **Phase I- Comprehension and engagement levels of the print version of *Ayisha*.**

Phase I focused on examining pupils' reading engagement and comprehension when

interacting with a traditional print text, serving as a baseline for comparison with the electronic format. Participants were instructed to *read* the first two chapters of the print version of *Ayisha* silently for 15 minutes while the researchers observed their engagement levels based on various behavioural indicators: *physical behaviour, interaction, verbal response, emotional reaction, speed of reading, enthusiasm, focus, story recall, desire to continue and personal connection*. Participants were allowed to pronounce words under a low tone to help them grasp what they read. After the 15-minute reading session, each pupil was given a comprehension test on the chapters they had read. The duration of the test was 20 minutes, and pupils were assured that their test scores in this study would have no impact on their school grades.

#### **Phase II – Comprehension and engagement levels of the electronic version of *Ayisha*.**

As in phase I, *physical behaviour, interaction, verbal response, emotional reaction, speed of reading, enthusiasm, focus, story recall, desire to continue and personal connection* and comprehension measures were assessed to ensure comparability across formats. In Phase II, participants read the electronic version of *Ayisha* on the laptop computers provided by the researchers and on desktop computers in schools with ICT facilities. The electronic version of *Ayisha* had no hotspots to minimise the possible distraction during engagement. All pupils received instructions on how to navigate and read the eBook, with guidance, assessment, and observation conducted throughout the reading process. Participants read Chapters 3 and 4 in a 15-minute session, after which they completed a comprehension test lasting 20 minutes. Different chapters from the same book, *Ayisha*, were used for each format, so the participants may not be influenced by what they had previously read in the print format to anticipate the questions that may be asked after reading the electronic

version, so one format does not appear to have an 'advantage' over the other. This approach is consistent with other studies like Mangen *et al.* (2012), and Singer and Alexander (2017).

The researchers assessed each participant and graded them out of a total score of 30, since they were required to answer 30 questions per format of the book (print and electronic).

## RESULTS AND DISCUSSION

This section presents the results on readers' comprehension and engagement of both print and electronic versions of *Ayisha* across all schools. Although the data were collected in two phases, Phase 1 focusing on the reading comprehension and engagement of the print version and Phase 2 on the reading comprehension and engagement of the electronic version of *Ayisha*, the results and discussion are presented on the main themes: reading comprehension and reading engagement across both formats.

### Reading Comprehension

In assessing the decoding and linguistic comprehension of the print version of *Ayisha*, the following results were recorded. In School 1, the highest score was 25 out of 30 marks, and the lowest score was 13 out of 30 marks. Table 1 shows the scores for print and electronic versions of *Ayisha* across all four schools.

Five pupils passed with 15 marks or above in the print version, while six pupils did not pass in the electronic version in School 1. In School 2, the highest score was 23.5 out of 30 marks, and the lowest score was 6 out of 30. Six pupils passed, while two pupils did not. The group had an average score of 16.4 marks. In School 3, the highest score was 19.5, while the lowest was 8 out of 30. Four pupils achieved the pass mark, whereas the other four did not, resulting in an average score of 14.6. In School 4, the highest score was 28 out of 30, and the lowest, 19 out of 30; all participants passed, and the average score was 23, the highest average mark for all the schools.

In assessing the decoding and linguistic comprehension of the electronic version of *Ayisha* in School 1, the highest score was 20 out of 30, and the lowest was 12.5 out of 30. Two participants passed, and six did not, and the average score was 14.5. In School 2, the highest score was 15.5, and the lowest was 6, with only one participant obtaining the pass mark. The average score recorded was 10.6. The highest score in School 3 was 21, and the lowest was 9, with five passing, two did not pass, and one did not participate. The average score in School 3 was 15. In School 4, the highest score was 24, and the lowest was 11. Out of the eight participants, only one student did not pass the test, and the average score was 20.6.

**Table 1: Reading comprehension scores (print and electronic) across all four schools**

School 1			School 2			School 3			School 4		
Pts	P	E	Pts	P	E	Pts	P	E	Pts	P	E
A	21.5	13.5	A	23.5	13.0	A	14.0	24.0	A	25.0	24.0
B	14.0	12.5	B	17.0	11.0	B	17.0	19.5	B	21.0	19.5
C	23.0	18.0	C	18.0	8.0	C	10.5	25.5	C	25.0	25.5
D	15.5	13.0	D	15.0	7.0	D	19.0	11.0	D	19.0	11.0
E	14.0	13.5	E	6.0	6.0	E	9.5	22.5	E	28.0	22.5
F	13.0	13.5	F	16.0	12.0	F	19.5	20.0	F	23.0	20.0
G	17.0	12.0	G	22.5	15.5	G	19.5	20.0	G	23.0	20.0
H	25.0	20.0	H	13.0	12.0	H	8.0	22.5	H	20.0	22.5
<b>Average</b>	17.9	14.5		16.4	10.6		14.6	20.6		23.0	20.6

**Legend: Participants (Pts), Print version (P), Electronic version (E).**

Comparing the reading comprehension scores in both formats, as shown in Table 1, participants scored better in reading comprehension in print than in the electronic format across three schools, except School 3. This indicates that the participants were able to decode and had better linguistic comprehension of the story in print than in the electronic format. Though some individuals excelled in reading both print and electronic, their scores in print were better compared to electronic. For instance, Participants C and H in School 1 scored excellent marks for both print and electronic, but scores for print were relatively higher than the scores for electronic.

In School 2, only one pupil passed in the reading of the electronic version of *Ayisha*. Participant A scored the highest in reading print but did not make the pass mark for the electronic version. Although Participant G excelled in reading both print and electronic versions, the scores for print were relatively higher compared to electronic scores. Out of the eight participants, only Participants E and H did not pass reading in both print and electronic formats, with Participant E scoring the lowest in both formats. While School 3 performed better in both print and electronic versions compared to Schools 1 and 2, their scores for reading the electronic version were better compared to their print version scores. Participant D had a better score for print as

compared to eBook, though Participants F and G also performed well reading the electronic version; their scores for the print versions were the highest for their school.

Participants in School 4 had the highest scores in reading both the print and electronic versions. All participants passed in reading the print version; only one student did not obtain the pass mark in the electronic version. Although participants performed excellently in all media, the scores for print were better compared to electronic.

Although scores from print and eBook suggest that reading comprehension in both media for School 4 was better compared to other schools, scores for print suggest that participants had a better reading experience when reading the print version of the storybook. The outcome of the results suggests that pupils were able to decode, read and understand print books more than eBooks. This finding aligns with Ben-Yehudah & Eshet-Alkalai (2021), Kazazoglu (2020) and Støle *et. al.* (2020), whose studies found that pupils who read text in print scored better in reading comprehension tests than those who read digitally.

In Ghana, although many young readers prefer eBooks over printed books and eagerly await their introduction into the mainstream educational system because of their advantages (Ry-Kottoh, 2017), introducing a

new format in the classroom might affect the teaching and learning process. Though pupils in Ghana know and use eBooks, the research results indicate that their use in the classroom might negatively affect pupils in terms of comprehension (Reich *et al.*, 2019) and the overall teaching and learning process. Though the overall performance of pupils reading eBooks in the classrooms was encouraging, conscious efforts should be made to improve the digital literacy skills of pupils before eBooks are introduced into the educational system. Pupils' performance in this research may be attributed to the frequent use of print books and the lack of concentration when using eBooks (Reich *et al.*, 2019).

Also, pupils may be familiar with print books compared with eBooks, as they have access to them and use them for learning various subjects. The results of this study indicate that pupils react positively to print books. This resonates with Singer and Alexander

(2017), who opined that though they may read faster and feel more confident when reading digitally, their actual performance in the comprehension tests was better when reading in print.

### Reading Engagement

The researchers analysed how the participants interact with the content and architecture of *Ayisha* in the print and electronic formats. Table 2 provides the scores obtained by participants in School 1 during the reading of the print and eBook versions of *Ayisha* across various behavioural and emotional metrics to highlight the differences in each participant's engagement with each format. The participants were evaluated on ten behaviour indicators: *physical behaviour, interaction, verbal response, emotional reactions, speed of reading, focus, story recall, desire to continue, personal connections, and enthusiasm*.

**Table 2. Scores for Print and Electronic Reading Engagement - School 1**

Ppt	Print Book										Total
	P B	I	V R	E R	S R	F	St R	D C	P C	E	
A	4	5	5	4	4	4	5	5	5	3	44
B	4	5	5	3	5	5	5	5	4	5	46
C	5	5	4	3	4	5	4	5	3	5	43
D	5	5	4	3	4	5	4	5	5	3	43
E	4	3	3	3	3	4	3	4	4	4	35
F	5	4	4	4	5	5	3	5	5	5	45
G	3	3	4	3	5	4	3	3	3	4	35
H	4	3	3	3	4	4	3	4	4	3	35
EBook											
A	5	5	5	4	3	5	5	3	4	4	43
B	4	5	5	5	4	4	5	5	5	4	46
C	3	4	4	3	3	5	4	3	3	5	37
D	3	5	4	3	5	5	4	5	5	5	44
E	3	5	4	4	4	3	3	4	3	3	36
F	5	3	3	5	3	4	4	3	4	4	38
G	3	4	3	4	5	4	3	4	4	3	37
H	4	3	3	3	3	5	4	4	3	4	36

**Legend: Participant (Ppt), Physical Behaviour (PB), Interaction (I), Verbal Response (VR), Emotional Reaction (ER), Speed of Reading (SR), Focus (F), Story Recall (St R), Desire to Continue (DC), Personal Connection (PC), Enthusiasm (E).**

The total scores from participants in School 1 indicate that they were generally more engaged when reading the electronic version of the book compared to the print version. Specifically, four participants (D, E, G, and H) showed higher engagement with the eBook, while three participants (A, C, and F) preferred the print version. Participant B had equal scores for both formats, suggesting a similar level of engagement with each format. To further analyse engagement, scores for each reading metric were compared between the print and eBook versions. This comparison revealed interesting trends. For physical behaviour, three out of eight participants were more engaged with the print version, suggesting they enjoyed it more (Roskos *et al.*, 2012), while one participant preferred the eBook. The remaining four participants had the same scores for both formats, indicating no significant difference in their experiences.

In terms of verbal responses, two participants scored higher with the print version, one with the eBook, and five had equal scores, indicating a slight preference for print.

Emotional reactions were stronger for the eBook, with four participants scoring higher, while the other four had the same scores for both versions. Speed of reading was generally better with the print version, as five participants scored higher compared to only two for the eBook. This finding contradicts previous research by Singer and Alexander (2017), suggesting that students read faster in digital formats. Story recall was slightly better for the eBook, with two participants scoring higher, but six had the same scores for both versions.

Participants expressed a stronger desire to continue reading the print version, with three scoring higher compared to one for the eBook. Additionally, personal connection was deeper with the print book, as four participants scored higher than two for the eBook. Overall, the print version fostered stronger physical engagement, verbal responses, speed of reading, personal connection, and enthusiasm, while the eBook elicited stronger emotional reactions and supported story recall for two participants.

**Table 3. Scores for Print and Electronic Reading Engagement - School 2**

Print Book											
Ppt	P B	I	V R	E R	S R	F	St R	D C	P C	E	Total
A	5	4	3	4	3	5	5	4	5	3	41
B	4	3	4	5	4	5	5	4	3	4	41
C	5	5	4	3	4	5	4	5	3	5	43
D	4	4	3	3	3	4	4	4	3	3	35
E	3	3	4	3	4	5	3	3	3	3	34
F	4	4	4	5	4	5	4	4	4	5	43
G	4	4	3	3	3	4	3	4	3	4	35
H	4	4	4	4	4	5	3	5	5	5	43
EBook											
A	4	3	3	5	5	5	3	3	3	3	37
B	5	3	3	3	5	5	3	3	4	3	37
C	3	4	3	4	5	4	4	4	3	3	37
D	3	3	3	5	4	5	4	3	3	3	36
E	4	4	3	4	3	3	3	3	3	3	33
F	4	4	4	3	4	4	4	3	3	3	36
G	3	4	4	4	4	5	4	3	4	3	38
H	4	5	5	4	4	3	3	3	3	4	38

In School 2, participants demonstrated greater engagement with the print version of the book compared to the eBook. Out of eight participants, only two (D and G) showed better engagement with the eBook, while the remaining six scored higher when reading the print version of *Ayisha*. The total scores indicated that participants performed better with the print format, suggesting a clear preference for it over the electronic version. Participants' preferences significantly influenced their engagement levels and performance across both formats. The relevance of the reading material to their interests and backgrounds also played a crucial role; those who found the content more engaging tended to score higher. Additionally, factors specific to each medium, such as ease of navigation and tactile experience, may have affected how participants interacted with the formats, as noted by Johnson and Furgeson (2020).

A detailed analysis of the scores revealed that participants exhibited stronger physical behaviour, interaction, verbal responses, focus, story recall, desire to continue reading, personal connections, and enthusiasm with the print version. Specifically, four out of eight participants scored higher in physical

behaviour and focus with the print book, while only one participant scored higher for interaction with the eBook. In terms of verbal responses and personal connections, three participants favoured the print version, while two preferred the eBook, indicating a slight edge for print. The desire to continue reading and enthusiasm were notably stronger for the print version than the eBook, with seven and five participants scoring higher, respectively. Conversely, emotional reactions and speed of reading were stronger for the eBook, with five participants scoring higher in these indicators.

Overall, the data revealed distinct engagement patterns between the two formats. Participants C, F, and H showed the highest scores for the print version, indicating strong engagement, while Participant E had the lowest scores for both formats. Participant H maintained consistent engagement across both formats, scoring well in both. The findings suggest that while print books foster deeper emotional connections and enthusiasm, eBooks may evoke stronger emotional responses for some readers. This highlights the personalised nature of reading engagement, with preferences varying based on individual experiences and needs (Støle et al., 2020).

**Table 4. Scores for Print and Electronic Reading Engagement - School 3**

Ppt	Print Book										Total
	P B	I	V R	E R	S R	F	St R	D C	P C	E	
A	4	3	3	5	4	5	3	4	3	3	37
B	5	4	4	4	3	5	3	3	3	4	38
C	3	4	3	3	3	5	4	4	3	3	35
D	4	3	4	5	4	5	4	4	4	4	41
E	4	3	4	4	4	5	4	3	3	3	37
F	3	3	4	4	3	3	3	4	4	3	34
G	5	5	3	5	4	5	4	5	4	5	45
H	5	5	4	4	4	5	3	4	4	5	43
EBook											
A	4	4	3	4	5	5	4	3	3	4	39
B	5	3	3	5	3	5	3	3	3	3	36
C	3	5	3	3	5	5	3	4	3	3	37
D	4	3	4	3	4	4	3	4	3	3	35
E	-	-	-	-	-	-	-	-	-	-	-
F	4	4	4	3	4	5	4	4	4	3	39
G	5	3	3	4	5	5	4	4	4	5	42
H	5	3	4	3	3	4	3	3	5	5	38

In School 3, Participant G achieved the highest score of 45 for print books, indicating strong engagement. In contrast, Participant F had the lowest engagement score of 34. For the eBook format, Participant G again demonstrated high engagement with a score of 42, while Participant D had the lowest engagement score of 35. Notably, Participant E did not provide eBook scores, likely due to a lack of interest or difficulties in reading the format. Overall, Participant G exhibited high engagement across both formats, suggesting adaptability to different reading media.

Analysis of specific metrics revealed that most participants scored similar marks for physical behaviour and verbal responses across both formats. Interestingly, six out of eight participants had the same scores

for both metrics. Emotional reactions were notably stronger for the print version, with five participants scoring higher, indicating that print reading may evoke more significant emotional responses. Only one participant scored higher for emotional reactions in the eBook. Interaction scores were balanced,

with three participants scoring higher in each format and one participant scoring the same in both. Reading speed favoured the eBook, with four participants scoring higher, supporting findings by Al-Sulaimi and Al-Shihi (2017) and Tajuddin and Mohamad (2019) that digital reading is generally faster.

In terms of focus, four participants scored the same for both formats, while two scored higher in print and one in the eBook, suggesting overall focus during reading sessions. Story recall was equal across formats, with two participants scoring higher in each and three scoring the same. The desire to continue reading was stronger for the print version, with three participants expressing a preference for print, while four showed equal interest in both formats, and none preferred the eBook. Personal connection scores were mixed, with one participant scoring higher in each format and five scoring the same. Enthusiasm was slightly stronger for the print version, with two participants scoring higher, while four scored the same in both formats, and only one scored higher in the eBook.

Overall, findings from School 3 indicate that the print version fostered stronger emotional reactions, enthusiasm, verbal engagement, and motivation to continue reading, while the electronic version positively influenced speed

of reading. Personal connection, interaction, and story recall were similar across both formats, suggesting that the choice of format may not significantly impact engagement in these areas.

**Table 5. Scores for Print and Electronic Reading Engagement - School 4**

Print Book											
Ppt	P B	I	V R	E R	S R	F	St R	D C	P C	E	Total
A	4	3	4	3	5	5	4	4	3	4	39
B	3	4	4	4	5	5	3	3	5	4	40
C	3	3	4	4	5	5	4	4	4	4	40
D	4	3	4	3	4	5	3	5	3	3	37
E	4	4	4	3	5	5	5	4	4	4	42
F	4	3	4	4	4	4	4	4	4	4	39
G	4	4	4	3	4	5	4	4	3	4	39
H	5	4	3	4	4	5	4	4	4	4	41
EBook											
A	4	4	4	3	5	5	4	4	3	3	39
B	4	4	4	3	5	5	4	4	3	3	39
C	3	3	3	3	5	4	3	3	3	5	35
D	4	4	5	5	3	5	5	5	4	4	44
E	3	4	3	3	4	3	5	3	4	3	35
F	3	3	3	3	4	3	3	3	4	4	33
G	4	4	4	4	3	4	4	4	4	4	39
H	4	4	4	4	5	5	4	4	4	4	42

The results for participants in School 4 revealed distinct engagement levels when reading print books compared to eBooks. In the eBook format, Participant D achieved the highest engagement score of 44, while Participant F had the lowest score of 33, indicating that some participants found the eBook less engaging than the print version. Four participants (B, C, E, and F) scored higher for the print book than for the eBook. Participant H demonstrated consistent engagement across both formats, suggesting adaptability. Conversely, Participant D showed a notable preference for eBooks, while Participant E favoured print books.

in the eBook, while six scored the same in both formats, suggesting a slight advantage for the eBook. In verbal responses, emotional reactions, and enthusiasm, three participants scored higher in the print version, while two scored higher in the eBook, with three scoring the same. Reading speed favoured the print book, with three participants scoring higher, while none scored higher for the eBook. Participants also showed more focus with the print book, with four scoring higher. Overall, the desire to continue reading was stronger for the print version, with three participants preferring it over the eBook.

Analysis of specific metrics showed that three out of eight participants scored higher in the print version, one in the eBook, and four scored the same for both formats, indicating greater physical engagement with the print version. For interaction, two participants scored higher

## CONCLUSION

This study examined the reading comprehension and reading engagement levels of thirty-two Primary 4 pupils in Kumasi using the print and electronic versions of *Ayisha*.

The findings revealed that students demonstrated better reading comprehension and higher engagement when using print books compared to eBooks. This may be attributed to their greater familiarity with print materials, as print books are more commonly used in their educational environments. On reading engagement, the pupils demonstrated a stronger physical behaviour, deeper focus, stronger desire to continue reading, and better personal connection with the print version. Comparatively, participants read faster in print, especially in Schools 1 and 4, though Schools 2 and 3 reported improved reading speed with the electronic version.

While emotional reactions were more intense with the electronic version in Schools 1 and 2, the print book triggered stronger emotional responses in Schools 3 and 4, suggesting variability in how different school environments respond emotionally to digital content and print content. Story recall produced mixed results in both formats, with no single format proving superior across all groups. Enthusiasm was more pronounced in the print version in all the schools. Schools 1 and 2 showed better personal connections with the print book, while schools 3 and 4 recorded a split balanced engagement across the formats. While some participants excelled in print, others performed better in electronic formats. This underscores the importance of the availability of books in different formats to cater for the preferences and needs of different readers to improve the reading experiences.

Given that most pupils exhibited higher reading comprehension and engagement

levels with the print book compared to the eBook, it is recommended that pupils continue to read print books while electronic books are introduced gradually to support and improve their digital literacy skills. Using different chapters for the print and eBook engagement can be a limitation of this study and may have affected the strength of the comparison. We therefore recommend future research to focus on assessing comprehension and engagement levels using the same chapters across formats, as well as examining how school environment and facilities influence reading engagement.

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## DECLARATION OF CONFLICT OF INTEREST

The researchers declare there were no conflicting interests in carrying out this research.

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