

## Effect of Phonological Awareness on the Pupils' Reading Competence in the Lens of Kinyarwanda Early Grade Reading benchmarks: A case of Kirehe and Kicukiro Districts in Rwanda

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### ABSTRACT

*The study aimed to assess the phonological awareness effect on pupils' reading competence in lower primary schools in Kirehe and Kicukiro districts of Rwanda. Specifically, the study assessed: i) the nature and extent of teachers' use of phonological awareness in the teaching of Kinyarwanda literacy; ii) pupils' reading competence vis-à-vis the Kinyarwanda reading benchmarks; and iii) the influence of phonological awareness on pupils' reading competence. Vygotsky's socio-cultural theory of literacy guided the study, which employed a mixed-methods approach. The target population was 82355 individuals, consisting of 82291 pupils and 64 Kinyarwanda teachers. A sample of 397 pupils was reached using stratified random sampling, while 64 teachers were selected using purposive sampling. A questionnaire for teachers, a lesson observation checklist, interviews with teachers, and reading tests for the learners were used to collect data. Personal administration with on-the-spot collection was used to administer the questionnaire, while personal interviews and participant observation were used to conduct interviews and observations, respectively. Descriptive and inferential statistics were used to analyze and interpret quantitative data. Qualitative data were analyzed and interpreted through themes and verbatim patterns. Concerning the nature and extent of phonological awareness, the mean composite index of 3.78 suggests that there is a high level of implementation of phonological awareness-related teaching activities. Regarding the pupils' reading competence, there is a significant number of pupils who do not meet the reading expectations at all grades. Precisely, 39.94% and 22.84%, on the summation of all categories, are below the reading comprehension benchmarks in urban and rural areas, respectively. 52.50% and 42.90%, on the summation of all categories, are below the reading benchmarks for the number of words correctly read per minute in urban and rural areas, respectively. Regarding the influence of phonological awareness on reading competence, the p-values for P2, and P3 in urban schools and P1 to P3 in rural schools (0.000, 0.000, 0.014, 0.011, and 0.016 in that order) indicate a positive and significant influence of phonological awareness on the number of words correctly read per minute. The p-values for P2 and P3 in urban schools and P1 to P3 in rural schools (0.000, 0.000, 0.012, 0.001, and 0.000 in that order) indicate a statistically significant influence of phonological awareness on reading comprehension. It was concluded that with more practice of phonological awareness, reading competence will be enhanced. Teachers of Kinyarwanda should focus on phonological awareness at the word, syllable, onset, rhyme, and phoneme levels using methods like counting, categorizing, rhyming, and segmenting. Effective techniques to improve reading skills, particularly for non-readers, should be applied in both rural and urban schools. The Ministry of Education should ensure that teachers are well-trained in these methods through ongoing professional development and pre-service training programs.*

**Keywords:** Kinyarwanda Early Grade Reading Benchmarks, Literacy Teaching Techniques, Lower Primary, Phonological Awareness, Reading Competence

### I. INTRODUCTION

For a long time, a connection between phonological awareness and reading ability has been recognized. Studies have shown that students who begin school with strong phonological awareness are more likely to become successful readers, while those who lack this awareness often struggle with learning alphabetic coding skills and recognizing words (Stanovich, 2000). Research demonstrates that preschoolers and kindergarteners who receive training in phonological and phonemic awareness tend to become better readers (Vaughn et al., 2004). These skills are beneficial for students facing reading challenges and are valuable across all socioeconomic backgrounds (National Reading Panel, 2000; Vaughn et al., 2004).

Additionally, research by Grofčiková and Máčajová (2017) highlighted that phonological awareness is a critical factor among the abilities and processes essential for the development of reading and writing.

Phonological awareness is the conscious understanding that language is made up of sounds, and it involves the ability of students to recognize these sounds in speech to learn the relationships between sounds and letters. This broad concept encompasses skills such as listening, recognizing rhyme and alliteration, segmenting sentences, and blending and segmenting syllables and onset-rime (Al Otaiba et al., 2013; Ehri, 2000).

The World Bank (2015) notes that there is widespread agreement within the international community that improving literacy outcomes is essential for achieving educational goals. However, assessments of early-grade literacy in low-income countries show that many students are not acquiring fundamental reading skills. In some nations, a significant number of students at the end of grade 2 are unable to read even a single word from a simple paragraph in the language of instruction (Gove & Cvelich, 2011).

Rwanda's Education Sector Strategic Plan for 2019/2024 emphasizes the importance of children acquiring fundamental literacy and numeracy skills in the early grades, as these are the foundation for all future learning (Ministry of Education [MoE], 2019). This aligns with the findings of Strickland and Riley-Ayers (2006), who discovered that early literacy development in a child's mother tongue, along with early physical, social-emotional, and cognitive development, strongly correlates with academic success across various stages and subjects. As such, reading proficiency among primary students is vital for their future educational outcomes, as difficulties in mastering this skill at an early age could hinder their learning progress (Strickland & Riley-Ayers, 2006).

Rwanda's Vision 2020 aimed to address various aspects of economic development, including the education sector, with the goal of achieving a 100 percent literacy rate (Republic of Rwanda, 2012). However, persistent issues with Kinyarwanda reading skills among students have remained a concern over the years (Kang'a & Gichuru, 2016; Bahuwiyongera, 2021; Nkusi, 2019; Kamuzinzi, 2018; Nsanzimana, 2017; Gatete, 2019).

Despite the critical role that reading skills play in the future learning outcomes of primary school students, evidence indicates significant gaps in reading proficiency among pupils, with a reading rate of 86.3 percent (NISR, 2018). Research has shown that many students finish lower primary grades with reading abilities far below average (Malik et al., 2020). For example, Malik et al. (2020) found that across the first three grades, students scored highest on the listening comprehension subtask (76% in primary 1, 79% in primary 2, and 67% in primary 3).

However, as the tasks progressed from recognizing letters and syllables to more advanced skills like reading words and text, the average scores declined significantly. For instance, the correct words per minute were just 4.8% for primary 1, 16% for primary 2, and 16.2% for primary 3 in the oral reading fluency subtask. Additionally, there was a high percentage of students who scored zero on the reading comprehension subtask (65% in primary 1 and 50% in primary 2), with those who attempted the questions showing minimal understanding. The lack of adequate reading skills among primary pupils across different grades has sparked debates among educators regarding who is responsible for this shortfall, a concern that has also been increasingly voiced by education managers and parents in recent times (Mutuyimana, 2019; Nsanzimana, 2017).

Various studies have highlighted factors such as allocated learning time, in-class time, instructional practices (United States Agency for International Development, 2020), teachers' literacy instruction methods (Kang'a & Gichuru, 2016), perceptions of speaking proficiency (Niyibizi, 2015), school and classroom environments, home environments, and socioeconomic status (Education Development Center, 2016). However, there is a lack of research on the techniques teachers use to teach the mother tongue in the early grades and their impact on early-grade reading skills. The current study aims to explore this challenging issue by focusing on phonological awareness and its effect on pupils' reading skills in lower primary schools in the Kicukiro and Kirehe districts of Rwanda.

### 1.1 Statement of the Problem

Reading competence is recognized as the most important competence to be acquired in foundational learning because it cuts across the curriculum and is a predictor for further learning throughout human life.

Despite this awareness, evidence shows that there have been gaps in reading competence among the pupils in primary schools in Rwanda, with a rate of 86.3 percent (National Institute of Statistics Rwanda, 2018). This problem has also been more pronounced by scholars in recent times (Mutuyimana, 2019; Nsanzimana, 2017). If the problem of inadequate reading skills persists among lower primary pupils, their transition to other grades and future performance will be undermined. Given the above, this research was undertaken to examine the phenomenon of this gap through the lens of lower primary Kinyarwanda reading benchmarks.

### 1.2 Research Objectives

The specific objectives were to

- i. Assess the nature and extent of teachers' use of phonological awareness in the teaching of Kinyarwanda literacy in lower primary schools in Kirehe and Kicukiro districts of Rwanda.
- ii. Assess the pupils' reading competence vis-à-vis the Kinyarwanda reading benchmarks in lower primary schools in Kirehe and Kicukiro districts of Rwanda.
- iii. Establish the influence of phonological awareness on pupils' Kinyarwanda reading competence in lower primary schools in Kirehe and Kicukiro districts of Rwanda.

### 1.3 Research Questions

- i. What is the nature and extent of teachers' use of phonological awareness in the teaching of Kinyarwanda literacy in lower primary schools in Kirehe and Kicukiro districts of Rwanda?
- ii. What is the level of pupils' reading competence vis-à-vis the Kinyarwanda reading benchmarks in lower primary schools in Kirehe and Kicukiro districts of Rwanda?
- iii. How does phonological awareness influence pupils' Kinyarwanda reading competence in lower primary schools in Kirehe and Kicukiro districts of Rwanda?

## II. LITERATURE REVIEW

### 2.1 Theoretical Review

This study is anchored in Vygotsky's (1978) socio-cultural theory of literacy. In education, Vygotsky's social learning theory is widely recognized for introducing the concept of scaffolding, an instructional method where the teacher offers individualized support to enhance a learner's ability to build upon prior knowledge. Scaffolding is applicable across various content areas and educational levels, providing essential assistance that helps learners progress toward new concepts, skills, or understandings. This theory is relevant to this study because it emphasizes the central role of the learner in developing literacy competence. Most activities should be learner-driven, with minimal teacher assistance based on the learner's existing knowledge. As the learner's competence increases, the teacher gradually transfers more responsibility to the learner, enabling them to manage literacy tasks independently.

Scaffolding is a crucial element of effective teaching, where the educator continuously adjusts the level of support based on the learner's performance. In a classroom setting, scaffolding may involve modeling skills, offering hints or cues, and modifying materials or activities (Copple & Bredekamp, 2009). Bruner (1975) introduced the term scaffolding to describe how adults use actions and language to accelerate a child's knowledge acquisition. For internalisation and development to occur, Vygotsky (1978) argues that the assistance provided during scaffolding must be at the level of  $(i + 1)$ , with "i" representing the tasks the child can accomplish independently and "1" representing the additional level of support needed (Sowers, 2000).

Bickhard (1992) suggests that any method of simplifying a cognitive or social problem on the way to its solution can be seen as a form of scaffolding. Expanding on this idea, Sowers (2000) proposes that the assistance an adult offers can include summarizing previous actions, questioning the consequences of those actions, answering questions, clarifying misconceptions, or predicting possible outcomes. In the context of instructional scaffolding for reading, Applebee and Langer (1983) assert that adults or more proficient language users must provide the necessary support for learners to tackle unfamiliar tasks. They also identify five criteria—intentionality, appropriateness, structure, collaboration, and internalization—to assess the effectiveness of scaffolding for specific tasks.

Scaffolding also clarifies expectations through assessment. Instead of leaving students in the dark until they complete reading or writing tasks, scaffolded lessons provide examples of high-quality work from the outset. The criteria and standards for excellence are clearly communicated, which reduces uncertainty, surprises, and potential disappointment. Instructional tasks should challenge students at a level where they can succeed with some assistance but are unable to complete the tasks on their own. In this regard, the most suitable tasks involve skills that are still developing, or, in Vygotsky's (1978) words, skills that are not yet "ripe" but are "ripening."

Vygotsky's learning theory offers insights into why some children excel in reading and writing while others remain at the stage of decoding and scribbling. With "properly organized learning," it is possible not only to guide these children but also to support all children through the stages of reading development to become independent readers and writers. However, determining the components of such "properly organized learning" requires an understanding of how scaffolding can foster reading development in young children.

## 2.2 Empirical Review

Students' reading abilities can greatly improve when teachers focus on teaching reading through phonological awareness. Research across different languages has shown that phonological awareness is the strongest predictor of reading success (Liberman et al., 1989; National Reading Panel, 2000). Therefore, it is recommended that phonological awareness be one of the first and most essential skills that teachers help students master. Phonological awareness involves recognizing that language consists of sounds and being able to identify and manipulate these sounds to learn sound-letter relationships. This broad concept includes skills such as listening, rhyming, alliteration, sentence segmentation, and blending and segmenting syllables and onset-rimes (Adams, 1990; Al Otaiba et al., 2012; Ehri, 2000). Among these, phonemic awareness, as the ability to understand and manipulate individual sounds in words, is the most complex and crucial (Torgesen et al., 2000; Troia, 2004).

O'Connor (2014) found that phonological awareness is a foundational skill for reading development. Students who achieve proficiency in this skill by the end of first grade are likely to become successful readers, while those who do not may face ongoing reading difficulties. Thus, it is crucial for educators, especially those who teach struggling readers, to grasp the significance of phonological awareness and learn effective teaching methods.

Students who enter school with phonological awareness are more likely to become successful readers, whereas those without it often struggle with alphabetic coding and word recognition (Stanovich, 2000). Research shows that preschoolers and kindergarteners who receive training in phonological and phonemic awareness tend to become better readers (Vaughn et al., 2004). These skills are beneficial to students with reading difficulties and those from all socioeconomic backgrounds (National Reading Panel, 2000; Vaughn et al., 2004). According to Grofčíková and Máčajová (2017), phonological awareness is crucial for developing reading and writing skills.

The Holland (2017) study found that deficits in phonological awareness can put children at risk for learning disabilities such as dyslexia, emphasizing the need for explicit instruction in this area. Assessing and intervening with phonological awareness skills as early as preschool is therefore important. The study concluded that phonological awareness is essential for learning to read.

Landerl et al. (2022) reviewed cross-linguistic studies to investigate cognitive precursors to reading and found that phonological awareness was consistently linked to reading acquisition across various orthographies. They recommended that early-grade teachers focus on this skill. Vetsch-Larson (2022) studied the relationship between phonemic awareness and oral reading fluency in first-grade students and found that a four-week small group intervention significantly improved students' reading fluency.

Lee and Luo (2020) explored enhancing Chinese reading comprehension through intensive reading practices combined with phonological awareness (PA) instruction. They found that PA strategies, such as rhyming and syllabification, effectively improved students' reading comprehension skills. The study involved sixth-grade students, with significant improvements noted after PA instruction.

Camarata et al. (2018) investigated the relationship between language abilities and reading skills in children with mild to moderate hearing loss and found that phonological awareness, along with receptive language skills, predicted reading achievement.

Wilsenach (2019) studied phonological awareness in Northern Sotho learners and found that while these learners were better at identifying syllables than phonemes, phoneme awareness was a more accurate predictor of reading outcomes. This research highlights the importance of phoneme awareness in reading development.



### III. METHODOLOGY

The study employed a convergent parallel mixed-methods research design, a variation of the mixed-methods approach (Creswell, 2012). This approach was chosen to integrate both quantitative and qualitative methods, allowing for a more comprehensive understanding of the phenomenon through complementary data collection and analysis techniques (Ivankova & Stick, 2007; Creswell & Clark, 2011; Creswell, 2012). The combination of methods, including questionnaires and reading tests for quantitative data, interviews, and an observation checklist for qualitative data, facilitated integration and triangulation. This mixed-methods approach helps address limitations that might arise from using a single research paradigm, be it quantitative or qualitative (Creswell, 2012), and provides a more robust basis for concluding while meeting various study objectives.

The target population consisted of 82,355 individuals, including 82,291 pupils and 64 Kinyarwanda teachers. A sample of 397 pupils was selected through stratified random sampling, while the 64 teachers were chosen using purposive sampling. The questionnaire was administered and collected on-site; interviews were conducted through personal interviews; and observations were made using a checklist. Data were analyzed and interpreted using descriptive and inferential statistics, with qualitative data being examined through thematic and verbatim analysis.

### IV. FINDINGS & DISCUSSION

#### 4.1 Extent and Nature of Phonological Awareness in Kirehe and Kicukiro

The first objective of the study was to assess the nature and extent of teachers' use of phonological awareness in the teaching of Kinyarwanda literacy in lower primary schools in Kirehe and Kicukiro districts of Rwanda. Table 1 provides data on various aspects related to PA activities in a teaching context, including the mean, standard deviation, observed frequency, and percentage within the total for each statement.

**Table 1**

*Teachers' Self-Report on the Use of Phonological Awareness*

Statement	N	Mean	Std. Dev	Observed frequency	% within the total
Use of blending phonemes	63	4.40	.79	19	29.7
Use of identification of single phonemes	64	4.23	1.02	31	48.4
Use of sound word discrimination	64	4.03	.78	15	23.4
Opportunity for the learners to use segmenting phonemes	64	3.80	.89	20	31.3
Use of word segmentation	64	3.67	.89	15	23.4
Support learners to develop sound alliteration	62	3.27	1.30	29	45.3
Supporting learners to develop rhyming skills	64	3.09	1.29	34	46.9
<b>Composite index</b>		<b>3.78</b>	<b>.99</b>		

To articulate the magnitude of PA, teachers were requested to rate their use of phonological awareness using the listed suggestions on the reading teaching techniques questionnaire using a five-point Likert scale (Very often = 5, Often = 4, Neutral = 3, Rarely = 2, and Never = 1). Table 1 depicts the means, standard deviations, and observed frequencies of the measures used for PA. The interpretation of mean values used mean ranges depending on the lower and upper bounds between which each mean falls (4.21–5.00: Very often/Higher, 4.1–4.20: Often/High, 2.61, 3.–3.40: Neutral, 1.81–2.60: Rarely/Low, and 1.00–1.80: Never/Lower).

As substantiated by Table 1, the use of blending phonemes had a mean of 4.40 (standard . deviation: 0.79) with an observed frequency of 19 (% within the total: 29.7%). The use of identification of single phonemes had a mean of 4.23 (standard . deviation: 1.02) with an observed frequency of 31 (% within the total: 48.4%). The use of sound word discrimination got a mean of 4.03 (standard . deviation: 0.78) with an observed frequency of 15 (% within the total: 23.4%). The opportunity for learners to use segmenting phonemes was rated with a mean of 3.80 (standard . deviation: 0.89) and an observed frequency of 20 (% within the total: 31.3%). The use of word segmentation had a mean of 3.67 (standard . deviation: 0.89) with an observed frequency of 15 (% within the total: 23.4%). Support learners to develop sound alliteration was rated with a mean of 3.27 (standard . deviation: 1.30) with an observed frequency of 29 (% within the total: 45.3%). Supporting learners to develop rhyming skills got a rating mean of 3.09 (standard . deviation: 1.29) with an observed frequency of 34 (% within the total: 46.9%). The composite index for PA was 3.78 (standard . deviation: 0.99), which indicates a high frequency of PA since the mean value fell between a lower bound of 3.41 and an upper bound of 4.20.

The data suggests that the highest mean scores are observed in statements related to the "use of identification of single phonemes" and "use of blending phonemes," indicating a relatively high level of utilization of these activities



in teaching practices. The statements related to "use of sound word discrimination" and "use of word segmentation" have slightly lower mean scores, suggesting they are used to a lesser extent compared to the previous activities. "Supporting learners to develop rhyming skills" and "supporting learners to develop sound alliteration" have the lowest mean scores, indicating these activities are less commonly implemented in teaching practices.

The observed frequencies and percentages within the total provide additional context, showing the actual frequency of occurrence of each activity relative to the total number of observations. The composite index provides an overall average score, reflecting the average level of utilization of phonemic awareness activities across all statements. In this case, the composite index is 3.78, suggesting a high level of implementation of these activities overall.

In the qualitative phase, the researcher presented the qualitative findings from the teaching technique interview. The analysis of interview cases provided categories of ideas that were presented using narrative and verbatim patterns. In describing phonological awareness in the used teaching techniques, most teachers' submissions emphasized the use of identification of single phonemes, sound word discrimination opportunities for learners to use segmented phonemes, and use of word segmentation. One of the teachers stated it in the following words:

*Through the "I do, we do, you do" approach, I use teaching aids to teach syllables. First of all, I show different pictures to the children and together we identify syllable sounds. The teaching aids can be found in their textbooks or be brought by the teacher (TI1, 2023).*

This was in congruence with another teacher's submission who revealed that:

*I show various pictures to the children and request them to find out the new syllable to be taught. I also use the "I do, We do, You do techniques (TI7, 2023).*

Nonetheless, some teachers rush into the process and attribute less importance to phonological awareness. One of the interviewed teachers said,

*Sometimes, due to time constraints, I rush in the process and jump to reading and writing because they are more important and we normally assess the learners' achievement through reading and writing, (TI6, 2023).*

The submissions made by the teachers support the mean values of the quantitative data to support teachers' efforts in using PA techniques in their teachings. However, the mean values substantiate that more efforts are needed to enhance the levels and frequencies of the utilisation of some of the reading teaching techniques.

#### 4.2 Pupils' Reading Competence vis-à-vis the Kinyarwanda Reading Benchmarks in Lower Primary Schools in Kirehe and Kicukiro Districts of Rwanda

The second objective was to assess the pupils' reading competence vis-à-vis the Kinyarwanda reading benchmarks in lower primary schools in Kirehe and Kicukiro districts of Rwanda. Pupils' reading competence was modified into the number of words correctly read per minute and reading comprehension scores, as summarized in Tables 2 and 3, respectively.

**Table 2**

*Number of Words Correctly Read Per Minute Per Grade in Urban and Rural Schools*

Type of district										
	Urban					Rural				
	N	Non-readers (0 CWPM)	Does not meet expectations (1-6 CWPM)	Partially meet expectations (7-9 CWPM)	Meet expectations (10+ CWPM)	N	Non-readers (0 CWPM)	Does not meet expectations (1-6 CWPM)	Partially meet expectations (7-9 CWPM)	Meet expectations (10+ CWPM)
Grade 1 term 3 specific benchmarks	47	10 (21.27%)	10 (21.27%)	9 (19.14%)	18 (38.29%)	124	7 (5.64%)	9 (7.25%)	10 (8.06%)	98 (79.03%)
Grade 2 term 3 specific benchmarks	46	Non-readers (0 CWPM)	Does not meet expectations (1-9 CWPM)	Partially meet expectations (10-24 CWPM)	Meet expectations (25+ CWPM)	65	Non-readers (0 CWPM)	Does not meet expectations (1-9 CWPM)	Partially meet expectations (10-24 CWPM)	Meet expectations (25+ CWPM)
		2 (4.34%)	3 (6.52%)	17 (36.95%)	24 (52.17%)			2 (3.07%)	1 (1.53%)	25 (38.46%)
Grade 3 term 3 specific benchmarks	42	Non-readers (0 CWPM)	Does not meet expectations (1-17 CWPM)	Partially meet expectations (18-39 CWPM)	Meet expectations (40+ CWPM)	73	Non-readers (0 CWPM)	Does not meet expectations (1-17 CWPM)	Partially meet expectations (18-39 CWPM)	Meet expectations (40+ CWPM)
		2 (4.76%)	4 (9.52%)	14 (33.33%)	22 (52.38%)			1 (1.36%)	2 (3.07%)	44 (60.27%)

Note: CWPM= Correct Words Per Minute

As can be seen from the findings recorded in Table 2, in the urban district, of the 47 grade 1 pupils tested, those who met expectations were 38.29%. This is far below those who did not meet expectations (61.71%), the sum of non-readers (21.27%), those who did not meet expectations (21.27%), and those who partially met expectations (19.14%). In the rural district, of 124 grade 1 pupils, 79.03% met expectations, while 29.07% did not meet expectations on the summation of non-readers (5.64%), those who did not meet expectations (7.25%), and those who partially met expectations (8.06%).

Looking at Grade 2 specific benchmarks, in urban districts, of 46 grade 2 pupils tested, non-readers were 4.34%, those who did not meet expectations were 6.52%, and those who partially met expectations were 36.95%. The number of pupils who met expectations was 52.17%, showing a scanty difference between meeting expectations and non-meeting expectations. In rural districts, of the 65 grade 2 pupils tested, those who met expectations were 56.92%, against 43.07% for non-readers, those who did not meet expectations, and those who partially met expectations. There's improvement in Grade 2 performance compared to Grade 1 across both urban and rural districts. The findings call for efforts to reduce the percentage of students who do not meet expectations.

Looking at Grade 3 specific benchmarks, in the urban district, of the 42 pupils tested, 52.38% met expectations. This is not significantly far from the non-meeting expectations of 47.62% on the summation of non-readers, those who do not meet expectations, and those who partially meet expectations. In grade 3, of the 73 pupils tested in the rural district, 35.61% met expectations. This is very far below 64.38% of those who did not meet expectations on the summation of non-readers: 1.36%, those who did not meet expectations: 3.07%, and those who partially met expectations: 60.27%. Overall, the findings suggest the need for targeted interventions in both urban and rural areas to improve the number of words pupils can read per minute.

The number of pupils who are not able to perform reading at their grade level is still high. However, the majority of the teachers agree with research findings according to which aspects of pronunciation, vocabulary-building and acquisition, phonological awareness, comprehension, and fluency all revolve around reading (Kang'a & Gichuru, 2016).

**Table 3**  
*Pupils Reading Comprehension Scores per Grade in Urban and Rural Schools*

		Type of district								
		Urban				Rural				
Grade	N	Non-readers (0)	Does not meet expectations (20%)	Partially meet expectations (40%)	Meet expectations (60-100%)	N	Non-readers (0)	Does not meet expectations (20%)	Partially meet expectations (40%)	Meet expectations (60-100%)
Grade 1 term 3 specific benchmarks	4	23 (48.93%)	10 (21.27%)	3 (6.38%)	11 (23.40%)	12	27 (21.77%)	10 (8.06%)	16 (12.90%)	71 (57.25%)
	7					4				
Grade 2 term 3 specific benchmarks	4	Non-readers (0)	Does not meet expectations (20%)	Partially meet expectations (40%)	Meet expectations (60-100%)	65	Non-readers (0)	Does not meet expectations (20%)	Partially meet expectations (40%)	Meet expectations (60-100%)
	6	4 (8.69%)	1 (2.17%)	2 (4.34%)	39 (84.78%)		4 (6.15%)	1 (1.53%)	2 (3.07%)	48 (73.84%)
Grade 3 term 3 specific benchmarks	4	Non-readers (0)	Does not meet expectations (20%)	Partially meet expectations (40-0%)	Meet expectations (80-100%)	73	Non-readers (0)	Does not meet expectations (20%)	Partially meet expectations (40%)	Meet expectations (80-100%)
	2	3 (7.14%)	5 (11.90%)	4 (9.52%)	30 (71.42%)		1 (1.36%)	1 (1.36%)	9 (12.32%)	62 (84.93%)

The findings in Table 3 substantiated that in grade 1 in the urban district, 48.93% of pupils scored 0 in reading comprehension and thus qualify as non-readers. The number of those who do not meet expectations is 21.27%, while those who partially meet expectations are equal to 6.38%. A scant number of pupils, 23.40%, met the reading expectations in terms of reading comprehension. In the rural district, 21.77% qualified as non-readers, while 8.06% of pupils did not meet expectations. Those who partially met expectations were 12.90%, while 57.25% met reading expectations in terms of reading comprehension in Kinyarwanda.

In grade 2 in the urban district, 8.69% did not meet expectations. 2.17% of pupils partially met expectations, while 84.78% met expectations. In grade 2 in the rural district, those who did not meet expectations were 6.15% against 1.53% who did not meet expectations, while 73.84% met expectations.

A look at grade 3 indicates that in the urban district, 7.14% did not meet expectations, against 11.90% who partially met expectations, while those who met expectations were 71.42%. In the rural district, 1.36% of pupils did not meet expectations. Equally, 1.36% partially met expectations. 84.93% were those who met expectations.

The findings indicated that in both urban and rural districts, a significant portion of students are non-readers. Urban areas seem to have a higher percentage of non-readers compared to rural areas. Rural areas have a higher percentage of students meeting expectations compared to urban areas. In a look at grade 2 in both types of districts, the majority of students are meeting expectations, but urban areas seem to have slightly more students not meeting expectations. In grade 3, urban areas have a higher proportion of students not meeting expectations compared to rural areas.

The findings are in congruence with literature, according to which students who enter school with phonological awareness are highly likely to learn to read successfully; those lacking phonological awareness have trouble acquiring alphabetic coding skills and difficulty recognizing words (Stanovich, 2000). Children in rural areas perform better in Kinyarwanda subjects than those in town.

#### 4.3 Influence of Phonological Awareness on Reading Competence

The third objective was to establish the influence of phonological awareness on pupils' Kinyarwanda reading competence in lower primary schools in Kirehe and Kicukiro districts of Rwanda Tables 4 and 5 summarized the findings thereof.

**Table 4**

*Phonological Awareness Vs Number of Words Correctly Read Per Minute*

		Dependent variable					
		NWCRM					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
		P1-US	P2-US	P3-US	P1-RS	P2-RS	P3-RS
Predictor							
PA	R Squared	0.513	0.827	0.656	0.900	0.834	0.634
	Constant	1.875	2.686	2.996	1.105	2.477	2.407
	Beta	0.202	0.178*	0.103*	0.533*	0.110*	0.112*
	P-value	0.283	0.000	0.000	0.014	0.011	0.016

Note: \* $p < 0.05$ , NWCRM = Words Correctly Read Per Minute

In the initial model, a value of 0.513 suggests that 51.3% of the variation in the number of words correctly read per minute (NWCRM) within urban schools can be explained by PA. When PA is zero, the estimated value of NWCRM is 1.875. For every unit increase in PA, NWCRM increases by 0.202 units ( $\beta = 0.202$ ,  $p = 0.283 > 0.05$ ). This indicates that PA does not significantly contribute to NWCRM, as the p-value exceeds the significance threshold.

In the second model, a value of 0.827 indicates that 82.7% of the variation in NWCRM in urban schools is accounted for by PA. When PA is zero, the projected value of NWCRM is 2.686. An increase of one unit in PA results in a 0.178 unit increase in NWCRM ( $\beta = 0.178$ ,  $p = 0.000 < 0.05$ ). This signifies a significant impact of PA on NWCRM, as the p-value is below the significance level. After recognizing the model's enhanced predictive ability for NWCRM, it was redefined by substituting the  $\beta$ -value in the equation with the regression coefficient and replacing  $x$  and  $Y^{\wedge}$  with the variable names. The resulting model equation was:  $NWCRM = 2.686 + 0.178PA + \epsilon$ .

In the third model, the  $R^2$  value of 0.656 indicates that 65.6% of the variation in NWCRM in urban schools is explained by PA. When PA is zero, the predicted value of NWCRM is 2.996. An increase of one unit in PA leads to a 0.103 unit increase in NWCRM ( $\beta = 0.103$ ,  $p = 0.000 < 0.05$ ). This indicates a significant contribution, as the p-value is below the significance level. After determining that the model enhances the prediction of NWCRM, it was refined by replacing the  $\beta$ -value in the equation with the regression coefficient and substituting  $x$  and  $Y^{\wedge}$  with the variable names. The resulting model equation was:  $NWCRM = 2.996 + 0.103PA + \epsilon$ .

In the fourth model, a value of 0.900 indicates that 90% of the variation in NWCRM in rural schools is explained by PA. The constant coefficient of 1.105 means the predicted NWCRM value is 1.105 when PA is zero. With a one-unit increase in PA, NWCRM increases by 0.533 units ( $\beta = 0.533$ ,  $p = 0.014 < 0.05$ ). This represents a significant contribution of PA to NWCRM, as the p-value is below the significance threshold. Once it was established that the model improves NWCRM prediction, it was refined by replacing the  $\beta$ -value in the equation with the





regression coefficient and substituting  $x$  and  $\hat{Y}$  with the variable names. The model equation became:  $NWCRM = 1.105 + 0.533PA + \epsilon$ .

In the fifth model, PA accounts for 83.4% of the variation in NWCRM in rural schools. The constant coefficient of 2.477 indicates that the NWCRM value is 2.477 when PA is zero. The results demonstrate that for each one-unit increase in PA, NWCRM rises by 0.110 units ( $\beta = 0.110, p = 0.011 < 0.05$ ), indicating a significant contribution of PA to NWCRM, as the p-value is below the significance level. After confirming that the model enhances the prediction of NWCRM, it was refined by replacing the  $\beta$ -value in the equation with the regression coefficient and substituting  $x$  and  $\hat{Y}$  with the variable names. The resulting model equation was:  $NWCRM = 2.477 + 0.110PA + \epsilon$ .

In the sixth model, PA accounts for 63.4% of the variation in NWCRM in rural schools. The constant coefficient of 2.407 indicates that the NWCRM value is 2.407 when PA is zero. The results show that for each one-unit increase in PA, NWCRM increases by 0.112 units ( $\beta = 0.112, p = 0.016 < 0.05$ ), indicating a significant contribution of PA to NWCRM, as the p-value is below the significance level. After confirming that the model improved the prediction of NWCRM, it was refined by replacing the  $\beta$ -value in the equation with the regression coefficient and substituting  $x$  and  $\hat{Y}$  with the variable names. The resulting model equation was:  $NWCRM = 2.407 + 0.112 PA + \epsilon$ .

Table 4 indicates that the p-values for NWCRM in P2 and P3 urban schools and P1, P2, and P3 rural schools are 0.000, 0.000, 0.014, 0.011, and 0.016, respectively. Given the statistically significant impact of PA on NWCRM, it is clear that PA is a positive determinant of NWCRM. Regular engagement in PA will lead to improvements in NWCRM.

**Table 5**  
*Phonological Awareness Vs Reading Comprehension*

		Dependent variable					
		RC					
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
		P1-US	P2-US	P3-US	P1-RS	P2-RS	P3-RS
Predictor							
PA	R2	0.899	0.977	0.905	0.908	0.795	0.901
	Constant	1.637	2.489	2.915	0.849	2.009	2.715
	Beta	0.282	0.243*	0.128*	0.603*	0.276*	0.120*
	P-value	0.052	0.000	0.000	0.012	0.001	0.000

Note: \* $p < 0.05$ , PA=Phonological Awareness, RC= Reading Comprehension

In the first model, the R squared value from the simple linear regression analysis of PA and RC is 0.899, indicating that 89.9% of the variation in RC in urban schools is explained by PA. The analysis shows that when PA is zero, the predicted RC value is 1.637. An increase of one unit in PA leads to a 0.282 unit increase in RC. However, this increase is not statistically significant, as the p-value is greater than the significance level ( $\beta = 0.282, p = 0.052 > 0.05$ ).

The second model shows an R-squared value of 0.977 from the regression analysis of PA and RC, meaning that PA explains 97.7% of the variability in RC in urban schools. The constant term 2.489 indicates that when PA is zero, the predicted RC value is 2.489. For every one-unit increase in PA, RC increases by 0.243 units. This increase is statistically significant since the p-value is less than the significance level ( $\beta = 0.243, p = 0.000 < 0.05$ ). After verifying that the model improves the prediction of RC, it was refined by replacing the  $\beta$ -value in the equation with the regression coefficient and substituting  $x$  and  $\hat{Y}$  with the variable names. The resulting model equation was:  $RC = 2.489 + 0.243PA + \epsilon$ .

In the third model, the R-squared value of 0.905 indicates that PA explains 90.5% of the variance in RC in urban schools. The constant 2.915 means that when PA is zero, the predicted RC value is 2.915. A one-unit increase in PA results in a 0.128-unit increase in RC, which is significant as the p-value is below the significance level ( $\beta = 0.128, p = 0.000 < 0.05$ ). Given that the model enhances the prediction of RC, it was refined by substituting the  $\beta$ -value in the equation with the regression coefficient and replacing  $x$  and  $\hat{Y}$  with the variable names. The resulting model equation is:  $RC = 2.915 + 0.128 PA + \epsilon$ .

In the fourth model, the coefficient of 0.908 indicates that PA explains 90.8% of the variability in RC in rural schools. The constant of 0.849 suggests that the predicted RC value is 0.849 when PA is zero. An increase of one unit in PA results in a 0.603 unit increase in RC, which is significant as the p-value is less than the significance level ( $\beta = 0.603, p = 0.012 < 0.05$ ). After confirming that the model improves the prediction of RC, it was updated by replacing

the  $\beta$ -value with the regression coefficient and substituting  $x$  and  $\hat{Y}$  with the variable names. The updated model equation is:  $RC = 0.849 + 0.603 PA + \epsilon$ .

In the fifth model, the statistical coefficient of 0.795 indicates that PA accounts for 79.5% of the variation in RC in rural schools. The constant of 2.009 shows that the predicted RC value is 2.009 when PA is zero. A one-unit increase in PA leads to a 0.276-unit increase in RC, which is statistically significant as the p-value is below the significance level ( $\beta = 0.276$ ,  $p = 0.001 < 0.05$ ). After confirming that the model enhances the prediction of RC, it was revised by substituting the  $\beta$ -value with the regression coefficient and replacing  $x$  and  $\hat{Y}$  with the variable names. The updated model equation is:  $RC = 2.009 + 0.276 PA + \epsilon$ .

In the sixth model, the coefficient of 0.901 indicates that PA explains 90.1% of the variation in RC. The constant of 2.715 shows that the predicted RC value is 2.715 when PA is zero. A one-unit increase in PA results in a 0.120-unit increase in RC, which is statistically significant since the p-value is below the significance level ( $\beta = 0.120$ ,  $p = 0.001 < 0.05$ ). After confirming that the model enhances the prediction of RC, it was revised by replacing the  $\beta$ -value with the regression coefficient and substituting  $x$  and  $\hat{Y}$  with the variable names. The updated model equation is:  $RC = 2.715 + 0.120 PA + \epsilon$ .

Table 6 indicates that the p-values for RC in P2 and P3 in urban schools and P1 to P3 in rural schools (0.000, 0.000, 0.012, 0.001, and 0.000, respectively) are below the significance level of 0.05, signifying a statistically significant impact of PA on RC. This significant relationship confirms that PA is a positive factor in determining RC. Regular engagement in PA is expected to improve RC.

These findings support the assertions made by Liberman et al. (1989), the National Reading Panel (2000), and Torgesen et al. (1997), who claimed that students' reading skills significantly benefit from instruction in phonological awareness. The results align with cross-linguistic research showing that phonological awareness is a key predictor of reading success (Liberman et al., 1989; National Reading Panel, 2000; Torgesen et al., 1997; Alcock et al., 2017). Additionally, the current study corroborates O'Connor's (2014) research, which highlighted phonological awareness as a critical skill for reading acquisition. Students who achieve proficiency in this skill by the end of first grade are likely to become proficient readers, while those who do not may face ongoing reading difficulties throughout their school years.

## V. CONCLUSIONS & RECOMMENDATIONS

### 5.1 Conclusions

Overall, the study highlighted that generally some phonological awareness teaching activities are frequently used, whereas others are less frequently used, which requires proactive measures to ensure that the use of phonological awareness can be enhanced overall. The study also found that there are a large number of pupils who cannot read at their grade level, highlighting evidence that measures are required to improve pupils' reading competence. The study revealed that phonological awareness statistically contributes to the number of words correctly read per minute and is a good predictor of reading comprehension. Therefore, through frequent practice of PA, reading fluency and reading comprehension among lower primary pupils will be enhanced. Therefore, the study reaffirms that teachers give more attention to the importance of phonological awareness to build reading competence among lower-grade pupils because it lays a foundation for reading skills.

### 5.2 Recommendations

It was therefore recommended that teachers of Kinyarwanda ensure phonological awareness is taught at the level of the word, syllable, onset, rhyme, and phoneme using different ways such as counting, categorizing, rhyming, segmenting, and manipulating the phonemes. Effective teaching techniques that may have a positive impact on reducing the percentage of students who do not meet reading expectations in Kinyarwanda, with special attention to non-reader students, should be applied, be it in rural or urban schools. The Ministry of Education and its stakeholders should ensure that teachers are well-grounded in teaching activities that enhance phonological awareness among lower primary pupils. This can be done through continuous professional development and pre-service teacher training programs.

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