

**AN INVESTIGATION OF PHONOLOGICAL AWARENESS SKILLS OF
LEARNERS WITH READING DISORDERS IN CLASS SIX IN SELECTED
SCHOOLS IN NAIROBI COUNTY**

BY

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REQUIREMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR
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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university or any other award.

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DEDICATION

I dedicate the present study to my parents George and Leah; my wife Gladys and our two children, Angelaida and Sean. I thank God for all of you because it is through prayers and encouragements that I have been able to complete this doctoral work.

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OPERATIONAL DEFINITION OF TERMS

Alphabetic code or alphabetic principle: This is the knowledge that sounds in some languages (for example, English) are represented by letters of the alphabet.

Early literacy: Beginning years of school life when children are taught basic skills in reading and writing.

Intervention: Reading programmes that employ phonological awareness activities to remedy reading difficulties.

Mis-articulations: These are the articulation deficits that are manifested in the performance of the respondents in phonological awareness tasks.

Nature: These are the various categories of mis-articulations exhibited by the respondents in phonological awareness tasks.

Measures: These are the various constructs of phonological awareness.

Easy task: Tasks in which the respondents had fewer difficulties as per the mean scores.

Difficult tasks: Tasks in which the respondents had most difficulties as per the mean scores.

Difficulties: Inability to correctly identify a sound or sounds in a word.

Normal Readers: These are readers who do not manifest reading disabilities.

Phonemes: These are the consonant sounds and the vowel sounds.

Phonemic awareness: The understanding that words are made of individual consonants and vowel sounds.

Phonics: It is the teaching of reading that puts more emphasis on letter-sound relationships.

Phonological awareness: Consciousness of the sounds of a language including syllables, onsets, rhymes and phonemes. It also entails the ability to blend, segment and manipulate sounds.

Reading Disability: It refers to difficulties resulting from insufficient phonological processing knowledge to decode words and non-words. It is used interchangeably with the term reading disorder.

ABBREVIATIONS AND ACRONYMS

C- Cognitive

E- Educational

IQ- Intelligent Quotient

K.I.C.D- Kenya Institute of Curriculum Development

LD- Learning Disability

NCLB- No Child Left Behind

RAN- Rapid Automatic Naming

RD- Reading Difficulties/Disabilities/ Disorders

PA- Phonological Awareness

EARC- Education, Assessment and Resource Centres

NIFL- National Institute of Literacy

NRP- National Reading Panel

KNBS- Kenya National Bureau of Statistics

SACMEQ- South African Consortium for Measuring Educational Quality

ABSTRACT

This study set out to investigate the phonological awareness skills of learners with reading disability. When one is considered a normal reader, he or she does not encounter much difficulty in reading and understanding texts. There are, however, children who have problems with phoneme identification and thus do not read well and they also have difficulties in comprehending texts. These learners should be identified and be assisted so that they can proceed with their learning lives. This study was guided by the following objectives: to investigate phonological awareness of learners with reading disability; to establish the correlation among the various measures of phonological awareness and to determine the significance of rapid automatic naming in reading. A sample of pupils in class six from the selected schools in Nairobi County was used in the study. Phonological awareness skills of these learners were tested to find out the nature of their awareness and skills in the tasks that were given. This study adopted an eclectic theoretical approach. The following theories guided the study: the Phonological Awareness Theory which states that reading based on the alphabetic system requires that readers be aware that words are made up of individual sounds and the Rapid Naming Theory which states that a good reader is one who has the ability to recall quickly and verbalize the names of presented objects which could also be individual alphabetical letters. The data were obtained from tape - recorded texts from the respondents and analysed to establish their nature of phonological awareness. Descriptive statistics which includes measures of central tendency and measures of correlation were used to summarize and describe the data. Tape recorded data were transcribed, analysed and then discussed. The results indicate that the respondents displayed phonological awareness skills in some PA tasks and experienced difficulties in some of the PA tasks. The study also found that there was no significant difference between the genders in their performances in the phonological awareness tasks. Various deficits in phonological awareness were also observed. These were categorized as mis-articulations of substitution, phoneme deletion, phoneme insertion, reading of the entire word instead of identifying the sounds; spelling the words; atypical and segmentation. It was also noted that there were correlations among the various measures of phonological awareness and absence of correlation among others. This showed that pupils have to be taught in all the measures for them to have phonological awareness skills. The study also looked at the significance of naming speed (RAN) in reading. It was observed that there were no significant differences in the time taken across the age groups and across the genders in the carrying out of the phonological awareness tasks.

CHAPTER ONE

BACKGROUND TO THE STUDY

1.0 Introduction

Reading is a literacy component that should be acquired by all. This is because it is a crucial skill that is required in an individual's day to day activities. Anyone with disabilities in reading is bound to experience tremendous personal, economic and social limitations in today's word loaded with diverse information that call for effective reading. Within the schools' contexts, learners have to read and understand the various subjects they study in order to perform well in their examinations. The National Institute of Literacy (NIFL, 2007) defines reading as:

A complex system of deriving meaning from print that requires all of the following: the skill and knowledge to understand how phonemes or speech sounds are connected to print; the ability to decode unfamiliar words; the ability to read fluently; sufficient background information and vocabulary to foster reading comprehension; the abilities to construct meaning from prints and the development of maintenance of motivation to read (p.1).

One of the essential elements of reading that formed the basis of the present study is the reading skill which involves the skill and knowledge to understand and recognize phonemes or speech sounds. The understanding of phonemes is largely referred to in reading studies as phonological awareness. It is the knowledge employed by readers to recognize words that rhyme, to identify the syllables in words and to recognize and manipulate sounds in words (Kirby, et al., 2003). Learners who manifest deficits in phonological awareness have been found to experience persistent difficulties in word decoding (Blachman, 1991). Due to the significance of phonological awareness in the reading process, the present study sought to investigate the manifestations of phonological awareness deficits experienced by selected pupils in class six with reading disabilities in selected schools in Nairobi County.

1.1 Selection of the Research

The K.I.E syllabus (2002) outlines the learning experiences and the reading tasks that learners in class six should be able to perform comfortably. These include: reading instructions and directions, signs, notices, posters and advertisements, formal and informal letters, sample poems and plays, comprehension passages and library books just to mention a few. For a standard six pupils to perform well in these tasks, they should not be having any reading difficulties. The scenario where there are learners who exhibit disabilities in reading is what led the present study

to target such learners and to investigate their phonological awareness skills in decoding words.

Moreover, studies conducted in some of the developed countries have reported that there are learners in primary schools who experience learning disabilities. Longitudinal studies in the United states of America have indicated that 10% to 20% of the population have significant reading disabilities (Reid, 2003, Vellutino, et al., 2004). Approximately, 80% of people with learning disabilities have reading disabilities (Reid, 2003). The present study was conducted in selected schools in Nairobi County. Apart from being the Capital City of Kenya, it also acts as the political and administrative centre of the country. It has 248 primary schools and the data from Kenya National Bureau of Statistics (2013) indicate that in the year 2011 in which the field work was conducted, the enrolment of pupils in primary schools in Nairobi was 364, 657. If it is assumed that 10% of the pupils would be having learning disabilities, this would translate to 36,465 having the problem. 80% of the pupils who would be experiencing reading disabilities would be 29,172. On the other hand, if 20% of the pupils with learning disabilities are computed, 72,931 pupils would be having the problem. 80% of this would be 58, 344 pupils with reading disabilities in schools in Nairobi. These figures show that reading disabilities is a learning disability that cannot be ignored in schools in Kenya thus the need to carry out the present study.

Uwezo (2010) gave tests to establish the pupils' literacy and numeracy competencies based on class 2 curriculums. They found out that pupils enrolled beyond standard 3 were not able to pass tests. Moreover, almost one to ten pupils even in class 7 could not pass both the English and numeracy tests based on class 2 level. Another study that supports the prevalence of reading disabilities in schools is the study done by the South African Consortium for Measuring Educational Quality (SACMEQ, 2005). It established that 21% of pupils in class six reached the required level of reading while 66% reached the planned minimum but were not likely to survive during the next year of schooling. These findings show that reading disabilities in all levels of school are real. This study set out to investigate class six pupils because at this level, the pupils are expected to be able to read so as to learn the new, a failure to do this leads to failure in education activities (Mercer, 2001).

1.2 Background to Reading Ability

Reading is a component of literacy that does not develop naturally like speaking thus children need to be actively instructed in its development. It is more complex because the children must be aware of the sound structure of the spoken language and then break the alphabetic code to acquire the letter-sound connections. Reading involves the integration of multiple factors related to an individual's experience, abilities and neurological functions. Most people who manifest reading

disabilities also have neurobiological deficits in the processing of language called phonological deficits. Moreover, children with reading disorders may also have a deficit in automatic naming speed. Difficulties in this area appear in assessment situations when the learners labour at mentioning familiar symbols, colours or letters rapidly in succession (American Academy of Ophthalmology, 2009). The phonological deficits and the naming speed deficits led to the adoption of the theories that are used in data discussion in the present study.

The current study focused on investigating pupils with reading disorders. Reading disorder is a learning disorder that involves significant impairment of reading accuracy, speed, or comprehension to the extent that the impairment interferes with academic achievement or activities of daily life. People with reading disorders perform below the level one would expect on the basis of their general intelligence and educational opportunities. Common problems in people with reading disorders include: slow reading speed, poor comprehension when reading materials either aloud or silently, omission of words or sounds while reading, reversal of words or phonemes, difficulty decoding syllables or single words and associating them with specific sounds, limited sight word vocabulary and dysfluency (Owens, 2008). The specific concern this study was to investigate the phonological awareness skills of learners with reading disorders which entails knowledge of phonemes that aids the learners in decoding of words. The next section gives components of phonological awareness.

1.3 Components of Phonological Awareness

Scarborough (2005) define phonological awareness as “the broad class of skills that involve attending to, thinking about, and intentionally manipulating the phonological aspects of spoken language, especially the internal phonological structure of words” (p.7). Phonological awareness is an umbrella term that includes awareness and manipulation of sounds at word, syllable and phoneme levels. Corresponding examples of tasks that are often used to measure or teach phonological awareness may include: word level activities, like identifying the number of words in a phrase or a sentence; syllable tasks such as syllable counting or syllable blending; rhyme tasks, such as identifying and producing rhymes; phoneme segmentation tasks, such as, counting or identifying phonemes, sound blending tasks, in which the learners join individual sounds or syllables to make words and phoneme manipulation, such as, identifying, deleting, adding, substituting or transposing phonemes or syllables (Schuele & Boudreau, 2008).

Phonological awareness is believed to develop from the global to the small and more subtle, that is, from the rhyme to the syllable, to intra-syllabic units, such as the onset, rhyme and then to the phoneme level (Muter, 2003; Goswami, 2005). The most difficult of the above phonological awareness components in English seem to be phoneme manipulation (Goswami, 2002; Muter, 2003). The difficulty of phonemic awareness derives in part from the fact that we speak in overlapping

vocal movements that blur distinctions between individual phonemes (Schuele & Boudreau, 2008).

Researchers employ a variety of cognitive and linguistic tasks to test phonological processing. Other tasks that can be used to test phonological awareness include but are not limited to decoding of phonetic non-words, non-word repetitions and naming speed of familiar stimuli such as letter, digits, colours and objects. The various tasks discussed in this section guided the present study in formulation of tasks to test the phonological awareness of pupils with reading disabilities who participated in the study. The tasks were specifically on the higher level of phonological awareness, that is, phonemic awareness because at class six, it was assumed that the learners had received adequate instruction in phonological awareness at the lower classes. The rhymes and onset-rhyme awareness are acquired earlier in school years (Snowling, 2000; Goswami & Bryant, 1990).

1.4 Acquisition of Phonological Awareness Skills

Children enter school with a diverse background of language experiences. Through hearing and speaking experiences, these young learners have had many opportunities to engage in incidental phoneme practice. The studies suggest that the kindergarten classroom is often the first environment for a child to have authentic, explicit phonological instruction. Diversity exists in relation to specific

tasks and levels of tasks that comprise phonological awareness. Rhyme, for example, is a phonological awareness skill that is usually easier for a young child to grasp than mastering blending or segmenting phonemes, which would be considered more difficult (Schmitz, 2011, Dahmer, 2010).

A proposed timeline for benchmarks or outcomes in phonological awareness is suggested by Schuele & Boudreau (2008). This timeline includes the following stages: during early kindergarten, the focus is on matching and generating rhyming words; during middle kindergarten, the focus is on matching words with the same beginning sounds, matching words with the same final sound, and segmenting initial and final sounds; during late kindergarten, the focus is on segmenting and blending two and three sound words containing variations of a consonant and a vowel; and during early Grade 1, the focus is on segmenting and blending sounds in words containing blends (Schuele & Boudreau, 2008, p. 10). Phonological awareness skills are often learned simultaneously, and children do not necessarily need to master one skill before focusing on a new one (Dahmer, 2010).

Another research that explains the acquisition of phonological awareness skills suggests that children progress from large units of speech to “increasingly smaller units of speech” (Cassady et al., 2008). Cassady et al., (2008) contended that “the progressive acquisition of phonemic awareness skills is proposed to follow a pattern: detection of distinct auditory units, manipulation of the units, and

eventually connection of the auditory stimuli to alphabetic representations in written language” (p. 510). Emerging as a reader is a gradual process that involves opportunities for children to engage in oral communication, which effectively leads them to a greater understanding of the language they use. Because the respondents in this study are class six pupils, the measures of phonological awareness they were tested on were: phonological production, blending of sounds, manipulation of sounds, segmenting of sounds in single words and non-word reading. This is with the assumption that they have gone through intensive instruction in reading and thus able to identify phonemes that make up the words they read.

1.5 Phonological Awareness as a Predictor of Reading

A number of researches have provided evidence to show that phonological awareness is a critical factor in learning to read (Elbro & Pallesen, 2002; Torgesen et al., 1999). The relationship between phonological awareness and reading appears to be present even after accounting for variance due to factors such as IQ, vocabulary, memory and social class (Bryant et al., 1990). The awareness that words can be divided into single phonemes is necessary to comprehend the alphabetic principle underlying the written language system (Bryne, 1998).

The understanding of the process of matching visual symbols to sounds is considered as a prerequisite for decoding of the unknown words which functions as a self-teaching device (Share, 1999, Ziegler & Goswami, 2005). Nevertheless, there is still no consensus on the size and directions of the relationship between phonological awareness and reading (Vloedgraven, 2008). Establishing the exact relationship is complicated by the fact that these relations depend on the specific tasks for phonological awareness and the child's level of development (Antony & Lonigan, 2004).

Vloedgraven (2008) posits that there are three different views that have been advanced to explain the relations between phonological awareness and reading. The first view is that phonological awareness abilities influence subsequent reading skills. Evidence for this view emanates from longitudinal studies that showed phonological awareness to be a significant predictor of later reading skills (Torgesen & Rashotte, 1994) and from intervention studies that showed that children progressed in reading abilities due to training programmes aimed at the improvement of phonological awareness (Hatcher, 2004; Troia, 1999). Advocates of this maintain that the relation between phonological awareness and reading is stable across time.

The second view is that phonological awareness develops as a consequence of learning to read. This is demonstrated by the research that showed that illiterate adults and readers in non-alphabetic script have no awareness of phonemes (Lukatela, et al., 1995, Morais, 1991). The last view is that the relation is bidirectional, that is, more rudimentary levels of phonological awareness promote the reading development and in turn, reading skills may influence the higher levels of phonological awareness (Perfetti, et al., 1987). The present study investigates learners in class six with reading disabilities. The phonological awareness tasks given to them are to help in investigating their phonological awareness skills in identifying sounds in words and also the skill of decoding non-words. Results from these tasks enabled the present study to establish the nature of the learners PA skills. The results also enabled the present study to determine the difficulty of the measures of phonological awareness while decoding words.

1.6 Statement of the Problem

As children progress through school, they are expected to be able to read in order to succeed in their academic activities. However, some children experience difficulties with reading and constantly experience frustration and failure in academic work. Researchers estimate that approximately 15% to 20% of school going children have learning disabilities. Further, it is estimated that 80% percent of school going children with learning disabilities have reading disabilities

(Fletcher & Lyon, 2001). When these children continue experiencing reading difficulties, their performance in reading tasks and examinations continue to be below expectations of their class and age levels.

The findings of Uwezo (2010) and SACMEQ (2005) show that children in schools are experiencing reading difficulties in Kenya. Uwezo (2010) found out that some pupils above standard 3 to standard 7 are not able to pass English and numeracy tests based on class two curriculums. SACMEQ (2005) suggest that 21% of pupils in class six are accomplished readers with the rest struggling in reading activities. Fortunately, reading disabilities have been studied from various perspectives and research has provided cumulative insights into the factors that contribute to RD. There is general consensus that deficit in phonological awareness is one of the strong contributor of RD (Wolf & Bower, 1999). Phonological awareness has been defined as a task that requires children to be aware of sounds heard in words, syllables and also to be able to manipulate phonemes in words. The insight that phonemes can be blended and segmented within a word is an abstract skill not easily attained.

It is expected that children in class six in Kenyan primary schools have learnt to read as they prepare for their examinations in various subjects. That is, they should have the knowledge of the language to be used, be able to separate spoken words into component sounds, discriminate letters of the alphabet and also recognise

printed words from a variety of cues such as: context, analogy or syntax. Notwithstanding, some children find difficulties in performing some of the reading activities named above. Fewer studies on phonological awareness and its impact on reading particularly with class six learners with reading disabilities have been conducted in Kenya. The present study endeavours to establish the nature of these learners phonological awareness to ascertain if learners with reading disability also have deficits in phonological processing. The deficits in phonological awareness will be categorised as mis-articulation. The mis-articulations are discussed within the framework of Phonological Awareness Theory. To help achieve this goal, tests on phonological production, phoneme blending, phonological manipulation, phonological segmentation and non-word reading were used. Scores in these tests were also used to explain the difficulties among the measures of phonological awareness.

Moreover, rapid automatic naming has also received consideration as another key indicator of reading disability. To the researcher's knowledge, few researches have been conducted to explore the significance of rapid automatic naming of class six pupils with reading disabilities in the schools in Kenya thus the need to carry out the present study to fill that gap. The time taken in answering each phonological awareness tasks was taken to help discuss the importance of naming speed in reading. Time in each task is explained within the confines of Rapid Automatic Naming Theory.

1.7 Objectives

This study was guided by the objectives that are stated below:

1. To determine the nature of phonological awareness deficits of learners in class six with reading disabilities in selected schools in Nairobi County.
2. To establish the difficulty levels among the various measures used to test phonological awareness.
3. To evaluate the significance of rapid automatic naming in reading.

1.8 Research Questions

This research set out to answer the following questions:

1. What is the nature of phonological awareness deficits of learners in class six with reading disabilities?
2. What is the difficulty levels among the various measures used to test phonological awareness?
3. What is the significance of rapid automatic naming in reading?

1.9 Research Assumptions

This part enumerates the assumptions upon which the study is based. They include:

1. There are manifestations of phonological awareness deficits by learners in class six with reading disabled.

2. There are the levels of difficulties among the various measures used to test phonological awareness.
3. There are contributions of rapid automatic naming in reading.

1.10 Significance of the Study

The present study generated information on the nature of the phonological awareness deficits of learners in class six with reading disabilities. It also looked at the difficulty levels on the various tasks used to measure phonological awareness and the importance of naming speed in reading. The findings of this study will benefit primary school teachers by sensitizing them on the importance of instructing learners on phonological awareness as it plays a major role in reading skills acquisition. This is because teachers who lack a thorough knowledge of the phonological awareness and its associated skills may be jeopardizing children's reading skills development.

It is also hoped that the findings of this study will be helpful to the Ministry of Education in planning the curriculum at the elementary levels and also planning intervention programmes for children with phonological deficits at the several screening centres in the Counties in Kenya. The study findings will also provide valuable insights to educationists, researchers and language therapists who would want to investigate linguistic difficulties associated with reading or any other

learning disability. This research will also make a contribution to the advancement of studies on phonological awareness and its significance to reading. It should stimulate interests for further research in all levels of education in Kenya. Parents can also benefit from this study in that they will learn that supporting their children's reading at home and providing reading resources will make them (children) better readers.

1.11 Scope of the Study

This study focused on phonological awareness skills. It particularly investigated non-word reading, phonological production, phonological manipulation which entailed phoneme identification, phoneme blending and phoneme segmentation in order to establish the respondents phonological awareness skills in single word reading and identification of phonemes in words. The study did not focus on some phonological awareness tasks such as rhyme awareness tasks as such tasks are said to be simpler and can be learnt by children at the kindergarten. The study also looked at the difficulties of the tasks used to measure phonological awareness and the significance of naming speed in reading.

1.12 Limitation

The present study was limited to 25 learners in class six with RD from selected schools in Nairobi County. The respondents were to be of similar chronological

age and also had been in the same school from class one. The reality on the ground presented children with reading disabilities who were not of a similar chronological age. The study therefore investigated learners whose ages ranged from twelve year olds to fifteen year olds. Thirteen learners were twelve year olds, eight were thirteen year olds, two were fourteen year olds and only one of the respondents was fifteen years old.

The study did not develop tasks that measure phonological awareness by identification of rhyming words or those that test on onset-rhyme awareness. It was confined to tasks that measure phonemic awareness. Other factors such as family income, parental education, a teacher's method of teaching reading and attitudes of the respondents could no doubt be investigated but were not considered in the present study.

1.13 Delimitation

The study was restricted to class six in selected schools in Nairobi County. At this level, the mis-articulations are discernible are manifestations of reading disabilities. However, screening for reading disabilities can be done at earlier stages, as early as class one and two so as to put learners in intervention programmes to remedy any reading disability.

The study attempted in the identification of learners with reading disabilities but with a limitation of screening them for cognitive deficits and visual problems. This was due to the limitation of time and the researcher's expertise in conducting such screenings.

1.14 Summary of the Chapter

The chapter has presented the introductory aspects that enabled the present study to be situated in the context of studies related to it. It gives the statement of the problem, the research questions and the significance of the study. Scope, limitations and delimitations of the study are also given in this chapter.

The next chapter gives a detailed review of literature that places the present study in the context of other phonological awareness studies.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.0 Introduction

Reading related studies have been presenting the benefits of phonological awareness and its significance to children's subsequent reading abilities. Various tasks have also been suggested to be used in measuring phonological awareness. There are also studies that have indicated that rapid automatic naming also plays a significant role in development of skilled reading. All these aspects were to be investigated in the present study. The chapter begins with a presentation of the conceptual framework. It also presents literature on reading disorder, the link between phonological awareness and reading, measures for testing phonological awareness and components of phonological awareness. It ends with a section that highlights the theoretical approaches that guided the present study.

2.1 Conceptual Framework

This section proposes a conceptual framework within which factors that entail the development of reading skills are visually depicted. Many factors can be used to explain the development of reading skills. These factors include: cognitive skills, visual input, orthographic awareness, random automatic naming and phonological awareness. If a pupil experiences any difficulties in the aforementioned processes,

his/ her reading will probably be disordered. The researcher also identified some intervening factors that are likely to influence a pupil's reading skills. These are the school environment and the home environment.

Figure 2.1 in the following page is a conceptual framework that can be used to analyse influencing variables and other major factors that can account for success in reading or disabilities in reading.

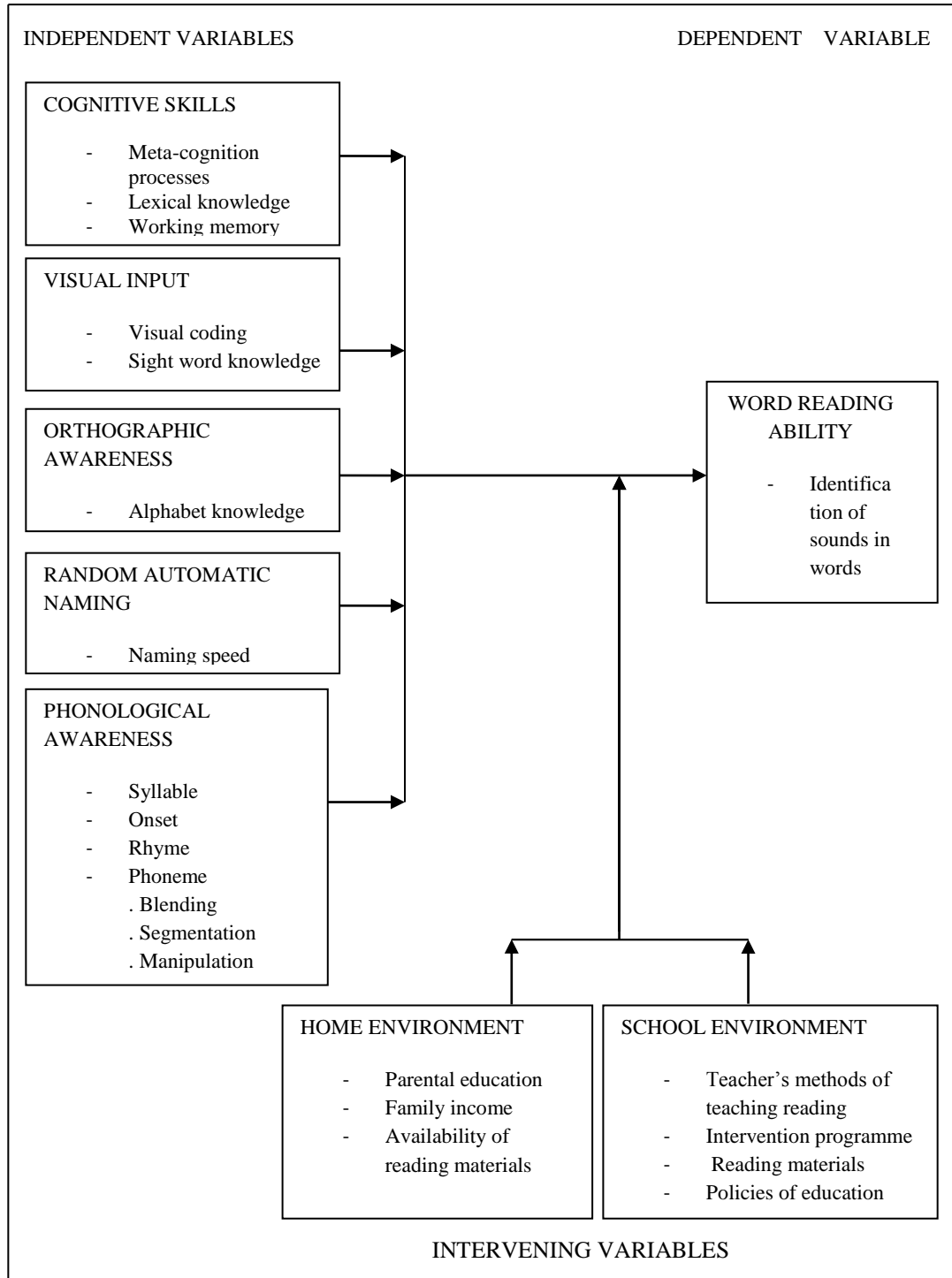


Figure 2.1: Processes entailed in reading of words (Source: Researcher, 2015)

When children enter school, they are expected to acquire various literacy skills such as reading, writing, speaking and listening. For some pupils, however, learning to read becomes a slow and a difficult process. If a child's reading competence is significantly below expectation based on age, intelligence, home and school environment, he/ she is often diagnosed as having a reading disability (Reid, 2003).

Various reasons in Figure 2.1 can be used to explain why some pupils are good readers while others experience difficulties in reading. The first reason is that some of the pupils could be having cognitive problems. Such learners will have problems with mastery of vocabulary in the brain. They could also lack proper working memory that is meant to help them recall what has been learnt. Secondly, learners with problems in their visual input are highly likely to experience reading difficulties. They could have reading disorders such as inversion of various sounds that appear similar, for example, /d/ and /p/ and reversal of sounds in a word, for example, "was" can be read as "saw". These two factors were not the focus of this study.

Thirdly, it is important to note that pupils with good reading skills do also have teachers with good skills on how to teach reading. Teachers having phonological awareness skills will help their learners to understand the reading process more than the ones who do not. Such teachers will also initiate appropriate intervention

programmes to help their learners based on the feedback they get from their reading. The curriculum should also support the teaching of reading and relevant reading materials should also be provided to the learners. Fourthly, the home environment could also influence a learner's development of reading. A home where the parents can buy books for their child, read the books with him/ her will be a conducive place for enhancing the child's reading skill development. On the other hand, a learner from a home where the parents education are low and they also have low income, is likely to be disadvantaged when it comes to practice what is taught at school, reading being one of them. This is because the parents may not be concerned with what goes on in school.

The major focus of this study was on phonological awareness skills of learners. Research has shown that some learners' specific reading disabilities are associated with challenges of phonological deficits. Learning to read is best predicted with phonological awareness at the single word level. The alphabetic knowledge and to some extent, the naming speed of the learners also play crucial roles in acquisition of reading skills (Cunningham, 1990, Snowling, 1990, Spear-Swerling, Brucker & Alfano, 2005).

In summary, this study focused on the following phonological awareness skills: phoneme blending, phonological segmentation and phonological manipulation at the single word level. A learner's failure at one or all the tasks was considered a

manifestation of a disorder in reading. Alphabet knowledge was used to explain the learners' letter-sound knowledge. Rapid automatic naming was also tested by recording the time the learners took in answering the phonological awareness tasks to determine its influence in reading.

2.2 Reading Disorders

A reading disorder is a learning disorder that involves significant impairment of reading accuracy, speed, or comprehension to the extent that the impairment interferes with academic achievement or activities of daily life. People with reading disorder perform reading tasks well below the level one would expect on the basis of their general intelligence, educational opportunities, and physical health (Reid, 2009).

Learning to read is a complex task that requires the coordination of the eye muscles to follow a line of print, spatial orientation to interpret letters and words, visual memory to retain the meaning of letters and sight words, sequencing ability, a grasp of sentence structure and grammar, and the ability to categorize and analyze. In addition, the brain must integrate visual cues with memory and associate them with specific sounds. The sounds must then be associated with specific meanings. For comprehension, the meanings must be retained while a sentence or passage is read. Reading disorder occurs when any of these processes

are disrupted. For that reason, the roots of reading disorder have proved difficult to isolate, and may be different in different individuals (Pennington, 2006).

Despite the complexity of reading disorder, researchers have found that the condition is at least partially inherited. The Centre for Reading Research (1999) studied a large family with reading problems by evaluating the reading and writing abilities of about 80 family members across four generations. The researchers found out mutations in specific genes that are associated with reading and writing deficits.

Reading disorder has also been associated with other causes other than genetic inheritance. This is due to the fact that many children experiencing this learning disability do not come from homes with history of reading disorder. Many theories suggest that functional problems in specific areas of the brain underlie reading disorder. Due to the complex nature and operations of a person's nervous system responsible for reading, it is highly likely that there are several different complications in the brain function directly linked to difficulty in developing reading skills. Researchers have indicated that 90% of children diagnosed with reading disorder have other language deficits. Still other research have indicated that there is a link between reading disabilities and visual challenges that hamper the speed with which affected children may read (Pennington, 2006; Reid, 2003).

Children with reading disorder may exhibit the following characteristics:, problems in understanding the sounds in words, sound order, or rhymes; problems with spelling, transposing letters in words; difficulty identifying single words omitting or substituting words; poor reading comprehension and slow reading speed in both oral reading and silent reading. Researchers have also found more changes that children with reading disorder often exhibit during their learning activities. These include: confusion with directions, or right/left-handedness; confusion with opposites (up/down, early/late); mathematics disorder; delays in spoken language; and disorder of written expression (Reid, 2009).

Some researchers indicate that phonemic awareness instruction has proven valuable for children with reading disabilities. Learning disabled children often have deficiencies with phonological processing skills (Shaywitz, 1996). Research reveals that children with reading disabilities and children with speech impairments have phonemic awareness skills that are significantly inferior to typically developing children (Sutherland & Gillon, 2005). In fact, according to Torgesen & Mathes (2002), deficiencies in phonological awareness are one of the most reliable diagnostic indicators of reading disabilities. These children require more explicit and intense training in phonological awareness to have a substantial impact on their deficits (Torgesen et al., 2002). The present study is based on the linguistic factors manifested by learners who were identified to be having reading disabilities. It specifically investigates the phonological awareness skills of the

respondents with the aim of understanding if they can manipulate sounds to decode words. The next section discusses the various phases of word recognition.

2.3 Developmental Phases of Word Recognition

Children develop the knowledge that words are made up of sounds even before they start school life. For them to become fluent readers, they must be able to create a connection between letter strings of words and the words meanings and the way the words are pronounced in their memory. These children have to know the alphabetic principle which entails the grapheme-phoneme relationships which enables them to identify sounds used in spoken words. Attempts have been made to explain the phases of word recognition developments.

Ehri's (1995) model of word recognition development has four phases: the pre-alphabetic, the partial alphabetic, the full alphabetic and the consolidated alphabetic. At the pre-reading stage, a child makes associations between salient visual features of words and their pronunciations or semantics representations. This is because the child is yet to develop the ability to form letter-sound connections. For examples, children have been shown to recognise and read logos from the familiar brand names or labels. If the letters in the logos were rearranged, a child in the pre-alphabetic stage would not recognise the word just as easily as long as the context remains the same (Johnstone, et al., 1996).

The second phase in Ehri's (1995) is the partial alphabetic phase. At this stage, the child is beginning to learn the connection between written words and pronunciations based on matches between graphemes and phonemes. The child is able to recognise the letter in the onset and the last letter in the rhyme of a word. The child is not able to identify the phonemes in a word because he/she has not yet mastered phonemic awareness. The child also lacks the full knowledge of the alphabetic system. The incomplete knowledge of the alphabet makes it challenging for a child to decode words as it is the knowledge of the letter-sound relationships that facilitates sight word reading (Roberts, 2003).

The third phase is the full alphabetic stage where a child can form complete connections between letters in written texts and phonemes in pronunciation. At this stage, children are able to decode unfamiliar words and they are also able to remember the correct spellings of words. They then acquire a powerful system for rapidly learning sight words and retrieving them from memory. According to Ehri (1995), the development of sight word vocabulary is key to the process of reading.

The fourth phase in Ehri (1995) model is consolidated alphabetic stage in which more and more words are retained in the memory of a child as spelling patterns begin to recur within the same and different words. Phoneme connections begin to

be consolidated into larger units such as onset, as rhyme (d-og, syllable (able), and whole word. This knowledge enables a child to read sight words as a unit. These phases of word recognition are important in the present study as they clearly outline the stages in the development of a child towards becoming an efficient reader. Children acquire the knowledge that words are made up of sounds that correspond to the spoken language. When they transit to the consolidated alphabetic phase, their phonological awareness improves significantly enabling them to decode unfamiliar words and even sight words comfortably.

By class six, learners are expected to be far above the consolidated phase as Ehri (1995) observes that by second grade which is an equivalent of class two in the Kenyan context, children have already transitioned to the consolidated alphabetic phase. Therefore, they are not expected to have deficiencies in phonological decoding of words. The present study also uses non-word reading sub-test. The results from this test are to guide the researcher in establishing if the respondents attempted to read non-words from their sight word vocabulary.

2.4 Strategies Used by Learners in Reading Words

Ehri (1995) identified four strategies that readers employ in reading words. These are: decoding, analogising, predicting and recognising whole words by sight. Decoding is a word attack skill used to read unfamiliar words. It involves

identifying the sounds of individual letters, holding them in mind and then blending them into combinations that are recognised as real words. This strategy of reading words is a confirmation that children use their phonological awareness skills in reading familiar and unfamiliar words. This present seeks to find out if the respondents apply their phonological awareness knowledge in decoding the non-word items in the PA sub-tests. The strategies of analogising and predicting were peripheral to the present study. However, sight word reading which involves using memory to read words that have been read before is informative in the present study. Sight word is explained in the following paragraph.

Ehri's (1998) suggests that readers learn sight words by forming connections between graphemes in the spellings and phonemes in the pronunciations of individual words. The connections are formed out of readers' general knowledge of grapheme-phoneme correspondences. Graphemes are letter units symbolizing phonemes. Phonemes are the smallest units of "sound" in words. When readers look at the spelling of a particular word, pronounce it, and recognize its meaning, their grapho-phonemic knowledge is activated and forms connections between letters in that spelling and phonemes detectable in the word's pronunciation. These connections secure the sight word in memory with its spelling, pronunciation and meaning bonded together as a unit.

The process of forming connections allows readers to remember how to read not only words containing conventional letter-sound correspondences but also words that have less regular spellings. In remembering letters that do not correspond to phonemes, readers may remember them as extra visual forms. Or they may flag them as silent in memory. Or they may remember a special spelling pronunciation that includes the silent letter, for example, remembering "listen" as "lis-ten" or "chocolate" as "choc - o - late." Or they may recognize them as part of a larger spelling pattern, for example, the GH in -IGHT (Ehri's, 1998).

As readers accumulate words in memory that share spelling patterns with other words, these spelling patterns become functional units that can be used to form connections. These patterns may be parts of words, for example, common vowel-consonant endings such as -IGHT or -EAK, or they may be common words themselves, for example, -IT, -AND, or -ATE, or bound morphemes such as -ED or -ING. This eases the task of retaining multisyllabic words in memory as sight words. For example, to remember how to read "interesting," readers can form connections between four written and spoken syllabic units, IN-TER-EST-ING, rather than 10 grapho-phonemic units (Ehri, 1995; Ehri's, 1998). The information obtained about the approach of sight word reading will guide the present study in categorisation and explanation of mis-articulations that were categorised as being atypical articulations.

2.5 Late Emerging Reading Difficulties

Children may experience difficulties in learning basic reading skills such as phonological decoding and word identification even though many of them exhibit average intelligence and have also had adequate opportunities to learn (Levy, et al 2002; Vellutino, et 2004). Researches on reading disabilities have asserted the significance of phonological awareness of the sound structure of words and the abilities to manipulate the sounds which are crucial components in the development of reading ability (Turner, et al., 2002). It has been observed that even though there are widespread systematic approaches to teaching children on phonemic awareness and word decoding, a significant number of learners enter upper primary with notable deficits in reading ability (Manset-Williamson, et al., 2005).

Several of these learners also experience difficulties in automatic word identification, poor fluency while decoding words and deficiencies in comprehension (Vellutino, et al., 2004). Of concern is that by the time learners get to upper primary classes, they are likely to be resistant to remediation and they will be way above the age when reading is easily taught (Levy, et al 2002 Manset-Williamson & Nelson, 2005). The present study confirms that there are indeed children in upper primary classes, specifically, in class six with deficits in phonological awareness which is likely to impact negatively on their word

decoding skills, fluency and even comprehension of the texts they read. At class six, the learners should be reading to learn and not learning to read (Mercers, 2001). Children with reading disabilities may find it difficult to cope with the increasing demands of reading more difficult texts in the various subjects they learn in class six. Their lack of speed in word decoding and fluency in reading may make them to rely almost entirely on sight word and then they realise that the vocabulary and complexity of words become unmanageable. Such children end up being frustrated with reading activities.

2.6 Skills for Effective Reading

Reading has been defined as a complex of perceptual and cognitive acts along a continuum from word recognition and decoding skills to comprehension and integration (Owens, 2008). The evaluation of literature based on reading has identified five skills that a child should have learned in order to be a competent reader: phonemic awareness, phonics, vocabulary, fluency and comprehension.

NRP (2000) identified the following skills as components of better reading skills: phonemic awareness, phonics, vocabulary, fluency and comprehension. Phonemic awareness enhances word decoding and fluency through the awareness that written language has sounds that correspond to the spoken language. Phonics helps the children to understand the connection between the letters and the sounds in the oral

language. Vocabulary is used by readers to help them construct meaning from written texts and lastly, comprehension is the understanding of the written text. The other skills advanced as being important in reading are meant to foster comprehension of a written language.

Despite the fact that the present study focuses on phonological awareness, it is significant to point out the other skills that make a proficient reader. This is because the ultimate goal of reading by class six pupils is to be able to comprehend the texts they read in order to excel in their studies and not merely to have better words recognition skills. Phonemic awareness is however considered an important skill because it links oral language and written language.

2.6.1 The Connection between Written Language and Oral language

A number of researches have been conducted with the aim of understanding how oral language contributes to reading. The consistent finding is that children's oral language skills provides necessary background for later reading success (Griffith, et al., 2008; Nevills & Wolfe, 2009). Oral language skills are thought to develop in the brain and this ability enables the children to acquire a system that facilitates spoken communication (Nevills & Wolfe, 2009). This system allows a child to show sensitivity to the individual sounds of the language they speak despite the fact that they are not able to pay specific attention to the sounds (McBride-Chang,

2004). Young children are unable to understand that words are composed of sounds as they only extract meaning from complete utterances which contain words that they automatically and unconsciously combine (Adams, 1990).

To read proficiently therefore, a child must develop the awareness that their oral language has structures at the word level and also at the sound level (Gillon, 2004). This is normally a difficult task for children but as they progress in their learning at school, they are taught the connection between oral language and print. Children who fail to acquire this ability are likely to have reading disabilities associated with lack of phonological awareness. The respondents in class six have been taught how to read in their earlier classes and are therefore expected to have the awareness that spoken language is connected to written language. The next section looks at the link between phonological awareness and reading.

2.6.2 The Link between Phonological Awareness and Reading

The connection between oral language and written language makes it necessary for one to be aware of the phonology of a language as a significant precursor to competent reading. The importance of phonological awareness and its relationship to a child's future reading competence has been demonstrated in literature (Gillon, 2004 Good, et al., 1998). It has also been indicated that a child's phonological awareness skills and learning to read are bidirectional (Gillon, 2004). To be

specific, a child must have the awareness of the phonology of their language to be able to understand and utilise the alphabetic principle (Ehri, 2005). Failure to acquire this understanding, often leads to persistent deficits in word recognition later in the learning years. This leads to instances where there are pupils with reading disabilities who perform poorly in reading tasks compared to their peers who have mastered the ability (Ball & Blachman, 1991). Consequently, a child who experiences difficulties in reading often exhibit phonological awareness deficits in which they are unable to use sounds of spoken language to help them in decoding the written language successfully. Learners with such deficiencies often demonstrate inadequate accuracy in decoding words (Moets, 2007). The respondents in the present study were reading disabled. The present study builds on the views above to investigate the phonological awareness deficits of class six learners with reading disabilities.

Phonological awareness has been defined as the ability to pay attention to and also differentiate between sound units and structure of a language and that these patterns are separate from meaning (Gillon, 2004; McBride- Chang, 2004). A child learns to identify, segment and manipulate a string of speech into sentences, words, syllable and then sounds (Ranweiler, 2004). The acquisition of this skill is demonstrated through tasks such as rhyming, identification of initial sounds and final sounds in a word, blending sounds to form words and segmenting words and syllable (NRP, 2000; Gillon, 2004). The present study tests the respondents' skills

of blending, manipulation and segmenting of various words. The aim is to establish their abilities in phonological awareness particularly at the phonemic level. Results from these sub-tests will be used to rank the tasks according to their difficulty.

Phonological awareness has been viewed as a broad construct. There are misunderstandings as to which skills and tasks best define phonological awareness (Runge & Watkins, 2006). There are researchers who indicate that all phonological awareness tasks are interrelated and therefore measure the same construct (Stahl & Murray, 1994; Antony & Lonigan, 2004), on the other hand, there are researchers who suggest that rhyming should be categorised as a different dimension of phonological awareness since it focuses on more basic skills of listening and hearing sounds (Runge & Watkins, 2006). However, Adams (1990) points that the levels of difficulties among phonological awareness tasks may result in conflicting evidence regarding a child's phonological awareness skills. For instance, a child may perform better in one phonological awareness task and poorly in another phonological awareness task.

Such inconsistencies in performance have made some researchers to pay more attention to the linguistic complexity of phonological awareness tasks. These features include: word length, number of consonant clusters, tasks requirements,

such as blending, segmenting and the size of the unit being manipulated, such as the sentence, word or syllable (Runge & Watkins, 2006). Researchers believe in the significance of the linguistic complexities in phonological awareness tasks also suggest that such tasks may be better predictors of future reading success (Adams, 1990). The present study uses different sub-tests of phonological awareness with different linguistic complexities to help it generate data to demonstrate the difficulty level of phonological awareness tasks, to determine the time the respondent spent in each task and to determine their deficits or lack of the same in phonological awareness skills.

2.6.3 Phonological Awareness Continuum

Researchers have come to an understanding that phonological awareness comprises several skills that can be put in a continuum (Goldsworthy, 1998). At the simple end of the continuum is rhyme awareness which refers to the knowledge that certain words share common rhymes and alliteration which is the ability to recognise similar sounds in an onset of a word (Israel, 2008). Some researchers suggest that alliteration and rhymes contribute to a child's reading development (Bryant, et al., 1990; Turner & Chapman, 2007). The present study does not deal with this awareness.

The second ability along the continuum is syllabic awareness which is the ability of a child to recognise sound similarities at the onset and the rhyme of the words

they read. It is the knowledge that words can be broken down into syllables (Ranweiler, 2004). Some studies have indicated that this awareness aids the children with the knowledge in becoming better readers than those who do not have it (Stahl & Murray, 1994; Ball, 1997). This knowledge is vital in analysis of the results from the segmentation tasks.

At the most complex end of the continuum is phonemic awareness which is the knowledge that enables a child to recognise that each word is made of individual phonemes (Schuele & Boudreau, 2008). Learners exhibit phonemic awareness in activities that require them to blend, segment, manipulate and delete phonemes (Moets, 2007; NRP, 2000). This skill develops early at the kindergarten and children gain more awareness in it as they proceed with their school life (Runweiler, 2004). The present study focuses more on the phonemic awareness which is the more complex phonological awareness construct in the continuum. This is because by the time the pupils get to class six, it is expected that they do not experience deficiencies in phonological awareness as it is a skill that is developed in the earlier years of school. The learners in class six with reading ability are thus investigated to establish if their failure to decode words was due to deficits in phonological awareness. A diagrammatic representation of the progression of phonological awareness development is exemplified in Figure 2.2

The figure below shows Arrow's proposed progression of PA development.

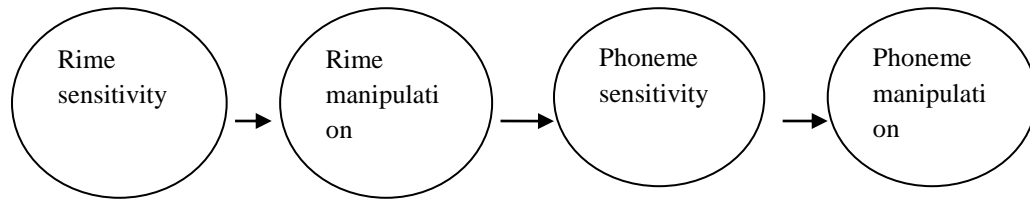


Figure 2.2: Proposed progression of phonological awareness development (Arrow, 2007)

The diagram shows that a child first learns how to detect rhyming words, this is then followed by a stage where the child can form rhyming words. After the child has known how to manipulate the rhymes, they are then taught how to identify phonemes from words. Once phoneme sensitivity has developed, the child moves to the most complex end of the continuum which is manipulation of phonemes.

The conceptualisation of phonological awareness as a continuum allows for both phoneme and rime awareness to play a role in the prediction of reading. Rime awareness is necessary for phoneme awareness to develop, along with letter name knowledge. Because rime awareness develops first, phoneme awareness will account for more variance in reading skill as phoneme awareness is the level of phonological awareness that develops at the same time as learning to read.

2.6.4 Phonemic Awareness and its Importance to Reading

Phonemic awareness which is an advanced skill of phonological awareness has been indicated to have the strongest influence on a child's reading development (Perez, 2008; Gillon, 2004; Adams, 1990). A study by Gillon (2004) indicated that phonemic awareness skill is a better predictor of reading success than socio-economic factors, IQ and vocabulary.

Phonemic awareness has also been suggested to have a bidirectional link with reading. Its knowledge increases a child's success in reading development and on the other hand, reading frequently enables a child to understand and perform better in phonemic awareness tasks (Vaughn, et al., 2004). Therefore, a child who experiences difficulty with reading often face challenges of phonemic awareness activities and a child who demonstrates deficits in phonemic awareness skills frequently is identified as having reading disabilities (Vaughn, et al., 2004; Adam, 1990).

Phonemic awareness is also important in reading because it reinforces a child's knowledge of letter-sound patterns and combinations which then enables the child to form mental representations of the written language and the spoken language (Torgesen, 1999). The knowledge of the link between letter knowledge and

phonemic awareness demonstrates that the two skills combine in the development of competent reading.

Phonemic responding which is the ability to produce a correct sound for a phoneme when it is accompanied by a letter or letters is the smallest functional response in the process of reading (Daly, et al., 2008). For a child to demonstrate mastery of this process, he or she must give correct response whenever he or she comes across the specific letter or letters in a written text. This process becomes automatic to learners who have mastered the letter-sound recognition and its application in reading but it can prove difficult to learners who have not mastered it. The present study requires the learners to use their knowledge of phonemic awareness to decode words in the sub-tests.

Phonemic awareness acquisition and mastery can be an uphill task to some children. This can be attributed to two issues. First, the articulation of individual phonemes in the oral language is never the case in communication. This is because individual sounds are blended into larger sound units and then used in speech (Gillon, 2004). A child, therefore, learns the larger units of a language such as sentences and words making the identification of individual sounds very difficult. Therefore, a child must be taught that words can be segmented into smaller parts called phonemes (Ranweiler, 2004).

Second, the difficulty in phonemic awareness acquisition could be challenging in an alphabetic language like English. This is because a child has to develop the knowledge to identify individual phonemes in words and to master the connection between a sound and its corresponding letter or letters (Adams, 1990). Because there is no one to one correspondence between phonemes and graphemes in oral language, learning the connection between letters and sounds becomes a big challenge to some children (Ranweiler, 2004). Difficulties in phonological awareness tasks in the present study could be because of the fact that English is not the first language for many of the respondents.

2.7 Phonological awareness Training and Intervention Programmes

Research indicates that almost all children can benefit from phonemic awareness instruction, including “normally developing readers, children at risk for future reading problems, disabled readers, preschoolers, kindergarteners, first graders, children in second through sixth grades, children across various socioeconomic levels, and children learning to read in English as well as in other languages” (NRP, 2000, p. 93). This shows that the respondents in the present study still have a chance of improving on their reading if proper interventions are put into place by their reading teachers and the schools at large.

One of the methods of teaching reading in Kenya is through the phonics approach. It is recommended that phonics instruction should be combined with phonological awareness instruction specifically phonemic awareness to enhance the students' awareness of sounds and how these sounds are combined to form words. It is believed that this will improve their word decoding skills thus during the text reading, they will be concentrating on comprehension of the texts they are reading instead of laboring to decode words in the texts (NRP, 2000).

The significance of phonological awareness to reading has widely been discussed. However, there is lack of consensus on the best ways to teach it. Programmes on phonological awareness training do differ in terms of the content, the sequence of components and the duration of the programme (Bus & Van Ijzendoorn, 1999). Some consistent findings have been made with regards to the components and features that indicate the usefulness of phonological awareness programme (Goo, et al., 1998). Some of these features are discussed in the following sections.

i) Integration of letter sound knowledge

Letter sound knowledge is considered to be crucial in phonological awareness programmes because it enables the children to recognise and match letters with their corresponding sounds.

Letter-sound knowledge is derived from letter-name knowledge (Treiman et al., 1998). Letter-sound relationships are not learned as arbitrary triads of graphemes, letter-names and letter-sounds. Familiarity with letter-names allows children to begin to induce letter-sounds from the names using the acrophonic principle. It is especially the case when the letter-sound is found at the beginning of the letter-name, for example, the letter 'k' is pronounced /ke/ with the sound /k/ at the beginning of the letter-name (Treiman, et al., 1998).

Evidence of this induction process comes from the errors that children make when asked to give the sounds of letters. The letter sound response of /d/ to the letter 'w' is an example of such an error. The letter 'w' is pronounced /dəbɪljʊ/, with the sound /d/ at the beginning of the letter name, hence the error in the response /d/. Similar errors occur in the letter sound responses to the letters 'u' and 'y' for example. All the consonant stops, except for /g/ have corresponding letter names that start with the sound. Two fricatives, /v/ and /z/ also have corresponding letter names that start with the letter sound, as well as the vowels 'e' and 'o'. All other consonant and vowel graphemes have sounds that are different from the initial sound in the name of the letter. Nine letters out of the twenty six in the alphabet can adequately have the sound induced using the acrophonic principle, while the remaining 17 cannot (Treiman, et al., 1998)

The importance of letter-sound knowledge has been shown in meta-analyses of phonological awareness intervention studies (Ehri et al., 2001b; National Reading Panel, 2000). The studies show that when letter exposure is controlled phonological awareness training does not contribute much to reading; it only increases the phonological awareness of those given the intervention as compared to a control group. The National Reading Panel found that the effects of phonological awareness training were strongest when the training included letters.

A study done by Ball & Blachman, 1991) found that children explicitly trained in letter sound knowledge improved in their performance on phonemic awareness tasks such as phoneme blending and phoneme segmentation. They indicate that children who went through such training not only exhibited the understanding of the two skills in isolation but were also able to match letters with their corresponding phonemic segments than children who did not receive such training.

The finding of (Ball & Blachman, 1991) is one of the researches that have indicated successfulness of integrating phonological awareness intervention to children with reading difficulties with instruction in letter-sound correspondence. Such integrated approaches to interventions have yielded twice as large positive results than those that train them in isolation (NRP, 2000).

McBride-Chang (1999) found strong correlations between letter-sound knowledge and performance on phonological awareness, measured with syllable and phoneme deletion as well as phoneme isolation, at four different times in five-year-old kindergartners. The concurrent correlations for letter-sound knowledge and phonological awareness stayed strong over time while the concurrent correlations between letter-name knowledge and phonological awareness became weaker.

The views discussed in the section are vital to the present study in that, they give the grounds in which one can understand that a respondent could fail to identify sounds in a word but nevertheless show letter knowledge in the same words.

ii) Incorporation of phoneme segmentation tasks

Phoneme segmentation is a phonological awareness task which requires a child to decompose a word into its individual phonemes (Nevills & Wolfe, 2009). It does not only increase a child's segmentation abilities but also promotes the development of reading specifically the ability to decode words (NRP, 2000).

Phoneme segmentation is viewed as a contributor in enhancing a child's performance in reading because it reinforces the link between graphemes and their corresponding phonemes (NRP, 2000). Results from longitudinal researches endeavour to demonstrate the significance of phoneme segmentation as a predictor

of future reading competence. For example, Nation & Hulme (1997) found that phoneme segmentation was a significant contributor in performance in phonological tasks and word recognition at the end of second grade compared to rhyme, alliteration and onset-rhyme segmentation.

Another study which supports the significance of phoneme segmentation is that of Snider (1997) who found that phoneme segmentation was largely predictive in the success of word decoding and reading comprehension at the end of second grade. The two studies reveal the importance of a child developing the knowledge of segmentation. Though the children in these two studies were in second grade, they point to the significance of phoneme segmentation skills, a factor which the present study considers while investigating the nature of the learners' phonological awareness skills.

Some studies have indicated that deficiencies in phonemic segmenting is one of the signs that a child is having reading difficulties which is likely to be experienced thorough out the learning life (Ball & Blachman, 1991). Phoneme segmentation does not develop naturally, thus, learners need to be instructed in it so that they do not experience difficulties in tasks that require them to segment. Phoneme segmentation task is used in the present study to establish if children have the knowledge of segmenting words to their constituent sounds.

iii) Incorporation of phoneme blending tasks

Phoneme blending which is defined as the ability to connect individual phonemes to form spoken words, as also been demonstrated to contribute to effective phonological awareness programmes (NRP, 2000). Despite the fact that phonemic blending has been considered to be a relatively easy task among the phonological awareness tasks such as phoneme deletion, substitution and segmentation, it is also indicated that it has high levels of abstraction (Smith, et al., 2008). This means that, for a child to be successful at blending, he/she must have the knowledge to connect individual sounds into meaningful words.

NRP (2000) found that phoneme blending was strongly correlated with future competent reading because it enables children to decode words without difficulties. This is because it enables a child who encounters an unfamiliar word in written language to recognise and blend the phonemes which correspond with the letters to successfully read the words and there is also an increased chance that the child will recognise the word when it is encountered at a later date.

The difference between segmentation and phoneme blending tasks cannot be ignored. Even though the two require a child to recognise and articulate individual phonemes in words, they differ with regards to: the level of phonological awareness a child must have to be competent in each of the tasks and the demands

in the child's ability to retain the phonemes in the memory. With regard to the first difference, a child is not only required to demonstrate that words can be segmented into phonemes; he/she should also have the knowledge of the property and size of the phoneme in the segmentation tasks. Conversely, phonemes are explicitly presented to a child thus the child only needs to possess the knowledge that sounds are combined to a meaningful word in the blending task.

With regards to the second difference which deals with demands of the tasks and a child's memory, a child is presented with phonemes that they could already be familiar with articulating in the phoneme blending tasks. This lowers the demands in phoneme blending task compared to the demands in phoneme segmentation where the child must first of all recognise all the phonemes within a word and then hold them in memory before segmenting them individually (Adams, 1990).

Some studies have demonstrated the importance of training children in both phoneme blending and phoneme segmentation. Torgesen, (1992) while investigating the effect of training in phoneme blending together with phoneme segmentation and training using phoneme blending only, found that children trained in both phoneme segmentation and phoneme blending performed better in measures of letter-sound correspondence and word decoding compared to the control group. Children trained in phoneme blending only, did not demonstrate

better gains on letter sound correspondence or word decoding compared with the control group.

Torgesen, (1992) findings demonstrate that phonological awareness training that incorporates both phoneme segmentation and phoneme blending are beneficial to children in enhancing their reading skills than when they are applied in isolation. It has also been found that, apart from improving their skills in these two tasks, children are also able to generalise their knowledge of blending and segmentation to other phonemic awareness tasks. Training in phoneme segmentation and phoneme blending also enables a child to decode new and unfamiliar words (Daley, et al., 2004). The present study uses phonological production, phonological manipulation, phoneme blending, phoneme segmentation and non-word reading tasks to determine their difficulty levels. The results from these tasks will also be helpful the nature of the respondents' phonological awareness.

iv) Incorporation of Non-words

Non-word reading fluency has proven to be an effective measure for evaluating phonological decoding (Torgesen, Wagner, & Rashotte, 1999; Vanderwood, Linklater, & Healy, 2008). When presented with an unfamiliar word, readers must break it into parts, retrieve sounds associated with the parts, and string them together to pronounce the unfamiliar word. This process can be assessed by

presenting examinees with pronounceable non-words. It has been shown that skilled readers analyze unfamiliar words or non-words more fully than do poor readers. For example, some poor readers tend to use initial consonant cues to guess at the rest of the word (Wagner, 2008). A full analysis of unfamiliar words contributes to their becoming sight words over time. Thus, the non-word assessment can reveal whether a student is decoding effectively by attending to all the letters and sounds that make up the unknown word. An advantage of assessing non-words is that these assessments prevent the reader from using context clues to identify the target word. Poor readers who have weak decoding skills tend to over-rely on context clues to try to make meaning of text (Wagner, 2008).

Non-word reading fluency is predictive of reading performance (Speece, Mills, Ritchey, & Hillman, 2003). In a meta-analysis of correlational literature on measures of phonological awareness, reading, and related skills, Swanson, Trainin, Necochea, and Hammill (2003) conclude that “[one of] the most important measures for predicting real word reading ability across an array of ages and samples is non-word reading (word attack)” (p. 429). This holds true for English language learners as well as for native English speakers; Vanderwood, Linklater, and Healy (2008) found that first-grade nonsense word fluency for English language learners was strongly predictive of third-grade measures of reading proficiency.

Given that knowledge of actual words (i.e., lexical knowledge) can help readers decode unfamiliar words, care should be taken when choosing non-words for an assessment of phonological decoding skill. For example, decoding PLONE might be facilitated by knowledge of the pronunciations of the related words PLANE and CLONE. The extent to which readers rely on their knowledge of real words when decoding the non-words depends on the nature of the non-words (Treiman, Goswami, & Bruck, 1990). The practice of creating non-words by swapping a single phoneme in a real word (e.g., “banana” becomes “panama”) should be avoided because it encourages use of knowledge of real words rather than decoding. These observations informed the present study in selection of non-word items which were not familiar to the respondents and were also non English words.

v) Incorporation of ICT in Programmes

There are also current studies that show that intervention programmes are improving alongside the development of technology. Computer assisted programmes and their effectiveness are reported in the work of Torgesen et al., (2009). They investigated the effectiveness of two computer assisted phonological awareness programmes. The programmes included in this study were Read Write and Type (RWT) and The Lindamood Phoneme Sequencing Programme for Reading, Spelling, and Speech (LiPS) (Torgesen et al., 2009). The programmes included in this study were chosen because they provide explicit and systematic

instruction in the critical areas of literacy including phonemic awareness, phonemic decoding and text reading (Torgesen et al., 2009).

This study was designed to investigate the following questions: 1) Are there reliable differences in instructional impact between the two programs?; 2) Do students receiving supplemental instruction programs demonstrate more rapid growth in early reading skills than students who do not receive instruction?; and 3) What proportion of students receiving the supplemental instruction remained considerably impaired in reading skills following the intervention? (Torgesen, et al., 2009). The participants of the study included 112 first graders that were determined to be at risk for reading disabilities (Torgesen, et al., 2009).

The participants were randomly assigned to one of three groups RWT, LiPS, or a control group (Torgesen, et al., 2009). The control group only received standard classroom reading instruction provided solely by their classroom teacher throughout the study. The intervention phase of this study lasted for two school years, during this time the participants received four, fifty minute sessions per week outside of the regular scheduled reading instruction, this supplemental instruction was provided by teachers who were specially trained in each program. The computer activities for both programs were coupled with teacher led instruction. The participants were assessed once pre-treatment and twice post

treatment first at the end of each instructional year then again one year following instruction (Torgesen, et al., 2009).

Torgesen, et al., 2009) used a battery of standardized tests to measure the participants phonological awareness, rapid naming, word-level reading measures, phonemic decoding accuracy and fluency, text reading, spelling, and verbal ability. The results of this investigation determined that reading outcomes for students who received the LiPS intervention were slightly stronger than for students receiving the RWT intervention. Therefore the results were not considered statistically reliable enough to prove an instructional difference between the two programmes. Students in both intervention groups showed reliably significant differences in phonological awareness, rapid naming, phonemic decoding, word reading accuracy and fluency, spelling and reading comprehension post treatment.

The authors attribute these gains to three important factors. First, the computer-based programs were presented as supplemental instruction to the students' classroom teacher-led reading curriculum, second each program addressed critical instructional needs for students with reading disabilities and third, teacher-led instruction was directly linked to additional computer instruction and direct application of skills taught (Torgesen, et al.,2009).

Determining the effectiveness of intervention programs will allow SLPs, reading specialists and classroom teachers to make informed decisions when choosing an appropriate remediation or prevention program. Given the vast amount of phonological awareness programs available, it is clear why a challenge would arise when trying to choose the best program for students (Lance, Beverly, Evans & McCullough, 2003). The consensus drawn from the current research is, there is not just one effective program that should be used, but instead, a set of standards that should be followed when creating and implementing a program that will facilitate phonological awareness skills and therefore improve reading. These findings show that programmes that can be used in intervention programmes for children with phonological awareness deficiencies and reading disabilities have been formulated. There is need for the educators in Kenya to adopt these approaches so that children who are at risk of reading failure are identified early enough and then put in intervention programmes. Even though the present study did not employ the use of ICT, it reviews the literature above to inform that ICT programmes can also be applied in phonological awareness training and intervention programmes.

2.8 Components of Phonological Awareness

Phonological awareness can be better understood by knowing the components that make it up. This knowledge can be obtained from understanding phonetics and phonology. Phonetics is the process of describing sounds the way they are used in

speech whereas phonology deals with the study of the abstract representation of sounds in a particular language (Roach, 2009).

Phonology makes it possible to create a large vocabulary which allows a language to be generative (Lieberman & Liberman, 1990). Phonemes of a language are used to create meaningful words in the particular language. A phoneme is defined as the smallest unit of speech sound, that is, an abstract representation of a speech sound in a language. Phonemes distinguish one word from another (Roach, 2009). There are forty four phonemes in the phonemic system of the RP (BBC) accent of English (Roach, 2009).

There are two main types of phonemes. These are called consonants and vowels. A combination of consonants and vowels form the syllable, which has a typical structure of sonority that peaks with the vowel (Hudson, 2000). Vowels and syllabic consonants form the peak of the word or syllable that they appear in while consonants may or may not appear on either side of the vowel.

Consonant sounds can be classified based on the following parameters: voicing, place of articulation and manner of articulation. Voiced consonants are those that are produced when there is vibration of the vocal folds while voiceless sounds are not accompanied by any vibrations. The sound /p/ is a voiceless bilabial stop while

/b/ is its voiced counterpart. Place of articulation gives the point of the vocal tract where the articulators approach or make contact in the production of the consonant, for example, in the production of the sound /p/ the lower lip and the upper lip come into contact. Manner of articulation explains how air used in production of speech sounds is obstructed in some way by the articulators. For example, /p/ is called a stop because during its production, the articulators come into firm contact, air pressure builds behind them, then the air is suddenly released with some explosion thus the name plosives. Figure 2.3 gives the Consonants of RP English.

Manner of Articulation	Place of Articulation							
	Bilabial	Labio-Dental	Dental	Alveolar	Post alveolar	Palatal	Velar	Glottal
Plosive	p b			t d			k g	
Fricative		f v	θ ð	s z	ʃ ʒ			h
Affricate						ʃ tʃ		
Nasal	m			n			ŋ	
Lateral Approximant				l				
Approximant	w			r		j		

Figure 2.3: Chart of English Consonant Phonemes

The parameters used in classifying consonants are given below. Example are given where the consonant is used a word.

/p/ voiceless, bilabial plosive (example of word: pay- /pei/)

/b/ voiced bilabial plosive (example of word: bus- /bʌs/)

/t/ voiceless alveolar plosive (example of word: term- /tɜ:m/)

/d/ voiced alveolar plosive (example of words: date- /deɪt/)

/k/ voiceless velar plosive (example of word: cup- /kʌp/)

/g/ voiced velar plosive (example of word: go- /gəʊ/)

/f/ voiceless labio-dental fricative (example of word: faint- /feɪnt/)

/v/ voiced labio-dental fricative (example of word: vote- /vəʊt/)

/θ/ voiceless dental fricative (example of word: thing- /θɪŋ/)

/ð/ voiced dental fricative (example of word: that- /ðæt/)

/s/ voiceless alveolar fricative (example of word: sad- /sæd/)

/z/ voiced alveolar fricative (example of word: zoo- /zu:/)

/ʃ/ voiceless palato-alveolar fricative (example of word: shoe- /ʃu:/)

/ʒ/ voiced palato-alveolar fricative (example of word: measure- /meʒə/)

/h/ voiceless glottal fricative (example of word: house- /haʊs/)

/tʃ/ voiceless palato-alveolar affricate (example of word: church- /tʃɜ:tʃ/)

/dʒ/ voiced palato-alveolar affricate (example of word: judge- /dʒʌdʒ/)

/m/ voiced bilabial nasal (example of word: mouse- /maʊs/)

/n/ voiced alveolar nasal (example of word: noise- /nɔɪz/)

/ŋ/ voiced velar nasal (example of word: sing- /sɪŋ/)

/l/ voiced alveolar liquid (lateral) (example of word: lost- /lɒst/)

/r/ voiced alveolar liquid (example of word: ray- /reɪ/)

/w/ voiced bilabial semi-vowel (example of word: wet- /wet/)

/j/ voiced palatal semi-vowel (example of word: yes- /jes/)

The vowels of English on the other hand are classified according to their qualities. That is, there are short vowels, long vowels, diphthongs and triphthongs. Vowels are further classified in terms of the vertical tongue height: high, mid-high, mid-low and low; the horizontal position of the tongue: front, central and back and the shape of the lips: spread, neutral and round.

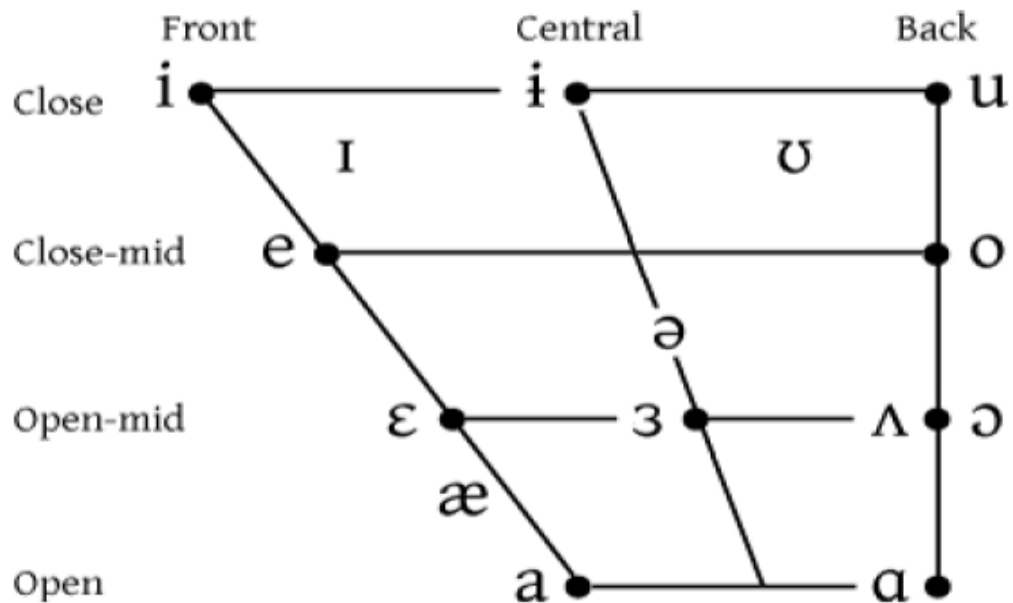


Figure 2.4: Chart of English Vowel Phonemes

Received Pronunciation English (RP) has a large number of vowel sounds. Roach (2009) groups them into four categories: short vowels, long vowels, diphthongs and triphthongs. These categories are exemplified in this section.

i) The short vowels

The following are the short vowels of English are: /ɪ/, /e/, /æ/, /ʌ/, /ɒ/, /ʊ/, /ə/.

Example of words in which each is used is given below.

/ɪ/: (example words: bill- /bɪl/, bid- /bɪd/)

/e/: (example of word: beck - /bek/, bed- /bed/)

/æ/: (example of words: bad- /bæd/, black- /blæk/)

/ʌ/: (example of words: shuttle- /ʃʌtl/, butt- /bʌt/)

/ɒ/: (example of words: don- /dɒn/, cock /kɒk/)

/ʊ/: (example of words: put- /pʊt/, push /pʊʃ/)

/ə/ (example of words: again- /əgeɪn/, ago /əgəʊ/)

ii) The Long Vowels of English

These are vowels which tend to be longer than the short vowels in similar contexts.

A length mark made of two dots is added to the symbol to show that they are long

(Roach, 2009). These vowels are: /i:/, /ɜ:/, /a:/, /ɔ:/ and /u:/. These categories are exemplified in this section.

/i:/ (example of words: beef- /bi:f/, sheep- /ʃi:p/)

/ɜ:/ (example of words: bird- /bɜ:d/, term- /tɜ:m/)

/a:/ (example of words: barn- /bɑ:n/, dance /dɑ:ns/)

/ɔ:/ (example of words: cause /kɔ:z/, door- /dɔ:/)

/u:/ (example of words: doom- /du:m/, boot- /bu:t/)

iii) Diphthongs

These are sounds which consist of a glide from one vowel to another. Diphthongs are similar to long vowels in length. The first part of the diphthong is much longer and stronger than the second part. Even though diphthongs contain two symbols, they are realised as one vowel sound. Diphthongs are classified according to the direction of the glide. The centring diphthongs glide towards the schwa /ə/.

Examples of centring diphthongs:

/ɪə/: (example of words: fear- /fiə/, jeer- /dʒiə/)

/eə/: (example of words: care- /keə/, despair- /dispeə/)

/ʊə/: (example of words: sure- /ʃʊə/, tour -/tuə/)

The closing diphthongs are divided into two: those that glide towards the close vowel /ɪ/ and those that glide towards the close vowel /ʊ/. Examples of closing vowels:

/eɪ/: (example of words: pay- /peɪ/, day- /deɪ/)

/aɪ/: (example of words: jibe /dʒaɪb/, file -/faɪl/)

/ɔɪ/: (example of words: boy /bɔɪ/, joy- /jɔɪ/)

/əʊ/: (example of words: job /jəʊb/, home- /həʊm/)

/aʊ/: (example of words: pound- /paʊnd/, hound- /haʊnd/)

iv) Triphthongs

These are the most complex RP English sounds. They are difficult to pronounce and they are also difficult to recognise. They are defined as a vowel sounds that glides from one vowel to another and then to a third all produced rapidly without interruption. Examples of triphthongs include:

/eɪə/: (example of words: layer- /leɪə/, player- /pleɪə/)

/aɪə/: (example of words: liar- /laɪə/, fire- /faɪə/)

/ɔɪəl/: (example of words: loyal- /lɔɪəl/, royal /rɔɪəl/)

/əʊə/: (example of words: lower- /ləʊə/, mower- /məʊə/)

/aʊə/: (example of words: hour- /aʊə/, power- /paʊə/)

A review and exemplification of consonants and vowels is important because they guide the present study in describing the nature of the respondents' phonological awareness as tested by the various PA sub-tests.

The other components of phonological awareness are the syllable, the onset and the rhyme. The linguistic status hypothesis (Treiman & Zukorsky, 1996) suggests that the development of phonological awareness is a reflection of a hierarchical structure of the syllable. Many studies indicate that awareness of syllables typically precedes onset-rhyme awareness and onset-rhyme awareness preceded phoneme awareness (Aldinis & Nunes, 2001; Lonigan, et al., 1998). The understanding that syllable, onset and rhyme are also components of phonological awareness helps the present study in identifying cases where a respondent could segment only at the syllable level, or the onset-rhyme levels yet the present study focuses on phonemic awareness.

2.9 Speech Perception and Vocabulary

One variable that is thought to underlie phonological awareness is speech perception (McBride-Chang, 1995b & Walley, et al., 2003). Speech perception means the knowledge of how words are structured and how they are stored in our lexicons. Speech perception is considered important for phonological awareness as

children need to be able to perceive phonemes in words to be able to differentiate between words that differ by only one phoneme, something that phoneme awareness also requires. The perception of phonemes, which is required for the basic, automatic use of language and speech representation, is an implicit, unconscious, perception (Arrow, 2007).

It is indicated that this perception of phonemes becomes more explicit during the preschool period (Walley, et al., 2003) in a similar manner to the phonological awareness continuum. The development of phonological awareness is thus based on the nature of the representations of speech units that are stored in the lexicon, or the level of phonological representation of words stored in the vocabulary (Walley, et al., 2003). Phonological awareness abilities become more explicit as phonological representations become explicit and distinct. Phonological sensitivity may reflect the development of phonological representations, and thus has the same pattern of development (McBride-Chang, 1995b).

There are at least two theoretical positions that have been proposed to explain the development of phonological representations and their relationship with phonological sensitivity. The first position is that phonological representations are not easily accessible in young children, or that they are indistinct (Lieberman, 1998). This lack of distinction is proposed to characterise children who become reading disabled (Elbro, Borstrom, & Petersen, 1998). The second position is that

phonological representations become increasingly segmented. Early phonological representations of words are holistic, and become increasingly segmented between one and eight years of age (Liberman, 1998).

Liberman (1998; 1999) theorised that language is inherently phonological, which is why the alphabetic script was developed. Within spoken language, there are two key components, phonological structures and phonetic gestures. Phonetic gestures are the motor-controlled articulatory gestures that produce and perceive speech. Phonological structures are made up of phonemes which are the abstract representations of those gestures. Learning to read an alphabetic script, unlike speaking a language, is not biologically inherent. In order for the phonological structure to be used Liberman suggested that there is a phonetic module which automatically produces and perceives speech at the most specific level. The phonological representations of words are produced for the listener of speech, thus there is no need to segment the different phonetic components.

When children are first asked to perform tasks that require phonological manipulation, particularly of the phonemic kind, they are often unable to do this because they have never had to use any conscious cognitive effort to access the phonological representations before. As the children become aware of the nature of phonetic structures, the phonemic level remains difficult to access due to the co-articulation of phonetic segments within words, and even between words. It is

suggested by Liberman that weaker phonetic modules would impair the ability to begin accessing the phonological representations and the development of phonological awareness is impaired. Thus children's phonological awareness is biologically determined by their phonetic structures and phonetic module.

Elbro (1996) also indicate that indistinct phonological representations will influence the measurement of phonological sensitivity and phonological manipulation. Distinctness as used by Elbro refers to the difference between a representation and its lexical or phonemic neighbours. There is a low distinctness, for example between the words *eyes* and *ice*, /aɪz/ and /aɪs/ respectively. These two words are distinguished by the length of the vowel, but could also be distinguished by a difference in voice of the consonant which would increase the distinctness. It is argued that children can tell the difference between words such as *glade* and *grade*, /gleɪd/ and /greɪd/ respectively, because they do have access to phoneme-sized segments. Children with indistinct representations, and thus poor access, they are unable to identify the distinguishing phonemes of /l/ and /r/. Such children might have rime awareness but they would be unable to manipulate phonological items because they are not represented distinctly. Rhyme sensitivity also requires that children have access to phonological representations that are sufficiently distinct to be able to discriminate between rhyme neighbours in the lexicon. Elbro does not, however, specify if larger phonological representations become distinct earlier than phoneme-sized phonological representations.

Elbro et al. (1998) tested six-year-old dyslexic and normal children of dyslexic and normal parents on measures of vocabulary, reading, and phonological awareness utilising deletion tasks at the morpheme, syllable, and phoneme level. They also used identification tasks at the syllable and phoneme level and a distinctness measure based on the child's ability to correctly pronounce words that were presented to them inaccurately. A lack of phonological distinctness resulted to both reading difficulties and to lower phonological awareness scores. Phonological distinctness did not explain all the difference in their measures of phonological awareness making it possible that the size of phonological representations could influence phonological awareness levels. However, the study did not separate linguistic unit size in phonological representations so no conclusion was made about the influence of increasing segmentation of representations. The authors also agreed that vocabulary could play a role in the development of phonological representations but did not appear to do so in their study, possibly because the subjects already had well developed vocabularies.

Another theoretical position is one in which children's phonological representations become more segmented as they get older, as a result of increasing vocabulary (Walley et al., 2003). Early speech perception research shows some discrimination at the phonemic level (Eimas et al., 1971), but there are researches that have found out that this early perception of speech is more holistic and of a syllabic nature (Houston, Santelmann, & Jusczyk, 2004; Johnson, Jusczyk, Cutler,

& Norris, 2003). As children begin to have a greater understanding of language and begin to extract words out of the speech stream they develop their mental lexicon. This is initially based on the strength of syllable stress in the initial position of a word (Walley et al., 2003).

Children find it easier to extract words that are monosyllabic and multi-syllabic words that begin with a stressed, strong syllable such as *parachute* (/pærə-ʃu:t/). In the earliest stages of lexical development the number of words is relatively small, and thus words can be represented as wholes. As children's word knowledge increases their lexicons increase in size and phonological representations are divided into subsyllabic units such as onsets and rimes. Finally words are segmented into phonemic representations that allow for the fine-grained distinction required to distinguish between all words in the English language. The change in phonological sensitivity is due to the increase in vocabulary during early childhood. A smaller sized lexicon at younger ages means that words can be discriminated as wholes. The young infant or toddler will generally only know a small number of nouns which are not similar, such as "Mummy" and "cat", which can be represented as wholes (Walley et al., 2003).

It could be that the more words children have in their mental lexicon, the more they need to be able to segment them in order to store and use their representations accurately in phonological awareness tasks. Research using the gating paradigm

has found that vocabulary does have a relationship with phonological representations and speech perception (Metsala, 1993). The gating paradigm presents words slowly and the point at which the subject recognises the word is measured. Adults need only a small part of the word presented before they recognise it, but children need more of the word presented, especially if the word is from a sparse neighbourhood and is a low frequency word (Walley, 2003). Children need larger chunks of words presented to them before they can identify what word it is because they have more holistic representations of words stored in their lexicons. They need the larger chunks presented before they can match them up with their phonological representations.

Children with better vocabularies tend to have better phonological awareness. This is because vocabulary influences the increasing segmentation of phonological representations and phonological representations underlie phonological awareness. Many researchers investigating pre-literacy development, but not phonological representations, have found strong correlations between vocabulary development and phonological awareness (Arrow, 2007).

The research on vocabulary, speech representations, and phonological awareness would seem to suggest that phoneme awareness is the result of an increase in segmented phonological representations. But the increasingly segmented representations are the result of explicit knowledge about letters and words. This

segmentation theory of phonological representations may underlie the continuum model of increasing phonological sensitivity and manipulation. These views confirm that for a child to be a better reader in English, he/she needs to develop strong phonological awareness skills in order to decode unfamiliar words that they encounter in their reading activities. By class six, the pupils are expected to have learnt a considerable amount of vocabulary in English because the syllabus supports the teaching and learning of vocabulary. Pupils who have acquired sufficient vocabulary will experience fewer difficulties decoding words since they will only need to trigger the phonological representations of sounds from their mental lexicon and apply it in reading. Respondents in the present study being reading disabled are likely to be so because they lack sufficient phonological awareness skills that they can apply in attacking the words they encounter as they read. Respondents who have not acquired adequate vocabulary are also likely to generalise their knowledge of sight words to read unfamiliar words ending making mistakes in reading. The present study will build on the views of these studies to investigate the nature of the respondents' phonological skills in decoding words.

2.10 Phonological Awareness in L1 and L2

Research with monolingual beginning readers indicates that higher levels of phonological awareness are associated with beginning reading and spelling achievements (Adams 1990). But the question remains whether the same

relationship holds for bilingual children who may already have some degree of phonological awareness in their L1 and not L2. Some scholars point out that bilingual children seem to be better at phonological awareness tasks than English monolingual children. (Oller, Cobo-Lewis & Eilers, 1998). Moreover, for bilingual children whose L1 and L2 share similar orthographic and phonological characteristics, there is not only transfer of phonological awareness between the two languages, but their L1 metalinguistic and phonological awareness account for significant variance in L2 literacy skills. Such skills include: spelling, word recognition, pseudo-word reading and reading comprehension (Cisero & Royer, 1995; Comeau, Cormier, Grandmaison, & Lacroix, 1999; Durgunolu, Naggy, & Hancin – Bhatt, 1993; Gottardo, Yan, Siegel, & Wade-Woolley, 2001 & Oller et al., 1998).

Durgunolu et al., (1993) for example, tested Spanish speaking first graders in a transitional bilingual education programme in the United States on phonological awareness tasks and word identification skills in both Spanish and English. They showed not only that phonological awareness in Spanish was closely related to Spanish word recognition, but also that children who performed well in Spanish phonological awareness tests were more likely to be able to do well on English phonological awareness tests and most important on English word and pseudo-word reading tests. That is, their L1 phonological awareness was a significant predictor of their performance on early literacy tasks both within and across

languages. Similarly, Cameau et al., (1999) studied English speaking grade 1, 3 and 5 children in French immersion classes and found cross language transfer in phonological awareness and word decoding skills (Lerner, 2006).

However, such transfers of phonological awareness, which is predictive in early literacy skills in L2, may be constrained to the cases where L1 and L2 share similar phonological or orthographic properties. In fact, unlike Oller et al., (1998), who showed that Spanish-English bilingual children are better in phonological awareness tasks than English monolingual children, Jackson, Holm and Dodd (1988) found no difference between English monolingual and Cantonese-English bilingual children's phonological awareness skills and found better performance of English-monolingual children on reading and spelling tasks as well as manipulation of phonemic information tasks. They also detected bilingual children's patterns of phonological awareness to be language specific, related to the phonemic and syllabic structure of their L1. Their findings further indicated that bilingualism itself may not be a sufficient condition to heighten phonological awareness. These conflicting findings may be related to the difference in the orthographic characteristics of the two languages (Lerner, 2006).

Gottardo et al., (2001) on the other hand measured Chinese ESL learners' L1 phonological awareness using a rhyme detection test. And in accordance with research conducted with L2 children with alphabetic L1 background, showed that

children's L1 phonological awareness was related not only to their L2 phonological awareness but also to their L2 reading skills. This is a very important finding for it points to an underlying process that is not specific to the child's ability to reflect on all phonology to which he/she has a minimum level of exposure. Phonological awareness requires one to reflect on and manipulate the features of an oral language (Lerner, 2006).

Gottardo et al.,(2001) finding implies that children's ability to reflect on and manipulate structural features of a particular language can be applied to an L2, whether it is typologically different from L1 or not. Regardless of the language minority children's background, the positive relationship between phonological awareness and other literacy skills within L2 is still apparent, as in the case of monolinguals.

From the arguments above, the present study did not consider the L1 of the respondents as crucial factor in the performance of the learners in the phonological awareness tasks. Children are taught letter recognition and sound awareness in pre-nursery and nursery schools. Further teaching and practices on reading in English takes place at all the levels of primary school. The assumption therefore is that learners in class six should not have problems when it comes to reading tasks.

2.11 Theoretical Framework

This study adopted two theories to be used in explaining the nature of phonological awareness and its importance to reading. The two theories are the phonological awareness theory and the rapid automatized naming theory. These are theories that have been advanced to explain how reading is acquired by children. It has been pointed out in research that these two phenomenon impact on a child's acquisition of competent reading. Lack of phonological awareness or deficit in RAN may lead to a reader being labelled as having reading disorders. Each of these theories is thus explained in details.

2.11.1 Phonological Awareness Theory

Phonological awareness a processing ability mostly related to literacy. It encompasses phoneme awareness which is the ability to manipulate individual sounds (phonemes) in words, and rudimentary phonological skills, such as judging whether two words rhyme. It demonstrates that individuals who have difficulty detecting or manipulating sounds in words will struggle with learning to read. Four decades of research has established this relation and it is evident in all alphabetic languages studied to date. Moreover, randomized intervention studies demonstrate that there is a causal relationship, as intensive instruction in phonological awareness improves literacy. For example, the National Reading Panel's 2000

report which described 52 controlled experimental studies published in peer-reviewed journals concluded that phonological awareness instruction has moderate and statistically significant effects on reading and spelling abilities. They state that explicit instruction on phonological awareness is beneficial for typically developing children, young children at risk of reading difficulties and for poor readers (Anthony & Francis, 2005; Catts & Kamhi, 2005; Ehri et al., 2001; Kirby, Pfeiffer, & Parilla, 2003).

Phonological awareness skills are distinguished by the task performed and by the size of the unit of sound that is the focus of the task. Examples of different phonological awareness skills that are distinguished by the type of task performed include: rhyming, counting the number of phonemes in words, matching sounds in words, isolating sounds in words, deleting phonemes or syllables from words, blending phonemes to produce words and segmenting words into their constituent sounds. Distinctions among phonological awareness skills based on unit of word structure include whether the syllables are the focus of the task or whether smaller intrasyllabic units, like onsets, rhymes or phonemes are the focus. The onset is the initial consonant or consonant cluster present in many but not all English syllables; the rhyme is the remaining vowel and consonants. For example, in the word “spin”, “sp” is the onset; “in” is the rhyme and /s/, /p/, /ɪ/, and /n/ are the phonemes (Anthony & Francis, 2005; Yopp, 2000; Anthony & Lonigan, 2004).

Debate over which phonological skills belongs to a construct of interest has directly influenced literacy curriculum and instruction, with some curricula emphasizing phoneme awareness and reading by sound- letter correspondence and other curricula emphasizing onset-rime awareness and reading by rhyme analogies (e.g., reading a new word like “string” by analogizing from familiar words that have the same rhyme unit, like “sing” and “wing”).

Persuasive evidence exists that phonological awareness is heterotypically continuous. That is, phonological awareness is a single unified ability during the preschool and elementary school years that manifest itself in different skills throughout a person’s development. Thus, there is consensus that phonological awareness refers to one’s ability to recognize, discriminate and manipulate sounds in one’s language, regardless of the size of the word unit that is in focus.

Two patterns of phonological awareness development are evident. First, children become increasingly sensitive to smaller and smaller parts of words as they grow older. Children can detect and manipulate syllable before they can detect or manipulate onsets and rhymes, and they can detect or manipulate onsets and rhymes before they can detect or manipulate individual phonemes within intrasyllabic word units. Secondly, children can detect similar and dissimilar-sounding words before they can manipulate sounds within words, and children can generally blend phonological information before they can segment phonological

information of the same linguistic complexity (Anthony et al., 2003). Finally, children refine phonological awareness skills they have already acquired while they are learning new phonological awareness skills (Anthony et al., 2003; Anthony et al., 2005).

The phonological awareness theory is very relevant to this study in that it informs the study of the importance of the learners having phonological processing abilities in order to be good readers. The theory also suggests the various tasks that can be used to detect if a child has developed phonological awareness skills. In determining the nature of phonological awareness skills, the present study used the following tasks: non-word reading; phoneme manipulation; phonological production; phoneme blending and phoneme segmentation all which were informed from the tasks suggested in this theory. The developmental patterns of phonological awareness are also important for this study because at class six, the learners are expected to have acquired adequate skills in phonological awareness. This is because the theory states that most of phonological awareness training takes place at the pre-school and elementary levels. The distinctions of phonological awareness skills based on the unit of word structure of analysis are also vital. This is because the present study looked at the skills of the learners at the word level, the syllable level and the phoneme level. Such distinctions are vital in the analyses of the responses of the respondents in the present study.

2.11.2 Rapid Automatic Naming (Naming Speed theory)

Rapid naming is the ability to recall quickly and to verbalize the name of a presented object. Naming speed is typically assessed by Rapid Automatic Naming Test (Denckla and Cutting, 1999), which requires children to name familiar colors, pictured objects, digits, and letters (Klein, 2002). Researchers and clinicians have known for years that the Rapid Automated Naming test (RAN) is a strong predictor of early reading ability and that people who have poor performances on these tasks are expected to have difficulty reading fluently (Katzir et al., 2006; Wolf and Bowers, 1999).

Although the repeated finding of phonological impairments in individuals with RD indicated a strong influence of phonological awareness deficits in the development of reading disabilities, the subgroup found by Morris et al. (1998) comprised of children with RD who did not have phonological impairments despite having reading problems suggested that a phonological deficit was not the only route to a reading impairment, as those children exhibited a rare impairment exclusive of any phonological deficit. Citing this and additional evidence, Wolf and Bowers (1999) posited that a second core deficit is implicated in RD. Their double deficit model of developmental RD suggests that phonological processing and naming speed/RAN each contribute independently to successful reading. Rapid naming

concerns the ability to rapidly recall and accurately say the name of some stimulus, typically a letter, number, color, or object.

The ability to rapidly name letters, in particular, is of utmost importance for reading, as letters and their corresponding sounds must be recalled rapidly and accurately for fluent reading to take place. Readers with difficulty in rapid naming tasks may have sufficient phonological processing skills necessary for decoding words, but they will not be fluent readers if their rapid letter recall ability is taxed (Wolf & Bowers, 1999). Consequently, reading and reading comprehension can suffer as a result of naming speed impairment. In sum, according to the double-deficit hypothesis, individuals with RD can have selective deficits in phonological processing, rapid naming, or both, and it is those readers with both impairments who tend to be the most severely affected in their reading ability (Wolf & Bowers, 1999).

Rapid naming tasks are characterized by whether the task includes orthographic recall (letters and numbers) or pictorial recall (pictures and colors). Good readers engaged in a rapid naming task frequently will read more fluently (i.e., faster and more accurately) on those tasks involving orthographic naming ability than on pictorial tasks (Klein, 2002).

Research supports the independence of naming speed deficits as a second predictor of RD. Wolf et al. (2002) provided empirical support for the existence of a naming

speed deficit in 144 second- and third-grade children with reading impairment using both IQ-discrepant and non-discrepant classifications of RD. Children performed a variety of measures tapping phonological and rapid naming components of reading skill, including the word identification, word attack, and passage comprehension subtests of the Woodcock Reading Mastery Test- Revised (Woodcock, 1987) and the letters subtest of the Rapid Automatized Naming Test (Denckla & Rudel, 1976), in addition to several other measures, including the Kaufman Brief Intelligence Test (KBIT; Kaufman & Kaufman, 1990). Multiple regression analyses indicated that both the phonological and naming speed measures accounted for unique variance in the reading measures given, signifying their independence as individual predictors of reading performance.

Support for naming speed deficits in readers with disabilities is also found in the adult population. Cirino, Israelian, Morris, and Morris (2005) explored the double-deficit hypothesis in a sample of 146 college students referred for learning difficulties. Participants were given a battery of both timed and untimed decoding (real word and nonword) and comprehension measures, the vocabulary subtest of the Wechsler Adult Intelligence Scale (WAIS-III; Wechsler, 1997), and the elision and blending subtests of the Comprehensive Test of Phonological Processing (CTOPP; Wagner et al., 1999), as well as the letter and number naming subtests of the CTOPP as a measure of rapid automatized naming. Participants also were given a visual search and attention task as a measure of general processing speed.

Several hypotheses were evaluated to explore the double deficit hypothesis in adults, including the relative contributions of phonological awareness and naming speed to both decoding and comprehension under timed and untimed conditions. Literature has shown the complex relationship between phonological awareness and naming speed and their relationship to reading.

The present study also used the rapid automatic naming theory to help explain the speed of reading of the respondents in the phonological awareness tests. This theory also aids the study in confirming or refuting the claims that phonological awareness and naming speed are two independent contributors to reading acquisition or the two are linked. It is this theory that informed the timing of each test the respondents took in the present study.

2.12 Summary of the Chapter

This section has given the conceptual framework that shows the various factors that influence the development of reading skills. The various researches reviewed above put this study into perspective and guided this study as explained. The study was also guided by the phonological awareness theory and the rapid automatic naming theory which many researchers have found to impact majorly in acquisition of skilled reading.

The next chapter discusses the methodology that guided the study in data collection procedures and procedures adopted in analysis of data.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

In the previous chapter a review of literature was done to situate and rationalize the present study in the area of phonological awareness and its importance to reading. This chapter explains the methodology used in collecting the data that were used in the present study. Specifically, the chapter describes the research design, the study area, study population, sampling procedures, data collection and the data analysis and presentation procedures used.

3.1 Research Design

The present study employed a descriptive design in investigation of phonological awareness skills of learners with reading disorders in selected primary schools in Nairobi County. Kasomo (2006) defines descriptive research as a method designed to investigate the current status and the nature of a given phenomenon. This means describing the characteristics of a particular group or individual. The present study focused on class six pupils. Single word reading was the dependent variable and the independent variables were measures of phonological awareness. These included: non-word reading, phonological production, phoneme blending, phonological manipulation and phonological segmentation.

A descriptive research includes measures and techniques that produce non-statistics data. These data can be words, symbols, pictures, sounds and other non-numerical records (Davies 2007 and McNabb 2004). These kinds of data are useful for describing, creating and understanding for subjective interpretation as well as for critically analyzing the subjects under study. This approach was employed in this study because part of the data was non-numerical. This was in form of words and sounds the respondents produced which were analyzed as either being correctly read or those that contained mis-articulations. The natures of errors made were put into the following categories: substitutions, omissions, additions, distortions and atypical. This was done in light of the theoretical framework and the reviewed literature.

Quantitative research on its part included techniques and measures that produce numerical data (Davies, 2007). This study also employed descriptive statistics in summary of the data specifically, frequencies and percentages of the scores of the respondents in the phonological awareness tests. This data was elicited through tape recording and was later on transcribed and then analyzed in prose and the numerical data presented using means, frequencies and percentages. Statistical analysis was also done to measure the correlation between the various measures of phonological awareness.

3.2 Study Area

The study was conducted in primary schools in Nairobi County. Nairobi County is the capital city of Kenya. It has eight administrative divisions. Being the capital city, it is cosmopolitan in nature and thus it is representative of the complex language situations of the country. Almost every ethnic group in Kenya is represented in Nairobi and many different races exist side by side. Most inhabitants of Nairobi are multilingual with the ability to use the first language, Kiswahili and English. The city also has people of different socio- economic backgrounds. It is therefore an ideal area of study because the respondents who speak the languages or who belong to any social classes had a probability of being selected for the study. A diagnostic test was thus used to select learners from class six who did not meet the threshold put in the diagnostic test to qualify as good readers. Such learners were then considered to be having reading disorders.

3.3 The Target Population and Sample Size

The 25 respondents, sixteen boys and nine girls ranging in age from twelve years old to fifteen years old, were selected from class six from selected primary schools in Nairobi County. The 25 respondents were selected from a group of 65 pupils who had been recommended by the various class teachers from the sixteen schools that had been visited has exhibiting various reading disorders.

By class six, it is expected that a pupil has undergone at least seven years of reading instruction. While describing the levels of acquiring reading skills, Mercer (2001) points out that by grade six, the learners should be able to read so as to learn the new. They are required to acquire a rich base of information and vocabulary by reading a wide variety of materials. Using the Kenyan education system, grade six is an equivalent of standard six. Therefore, it should be the case that learners in this level should have little difficulty in reading. Within the population of pupils in class six, the targeted respondents were pupils with reading disabilities.

The K.I.E syllabus (2002) outlines the learning experiences and the reading tasks that learners in class six should be able to perform comfortably. These include: reading instructions and directions, signs, notices, posters and advertisements, formal and informal letters, sample poems and plays, dictionaries and encyclopaedias, comprehension passages, supplementary and library books just to mention a few. For a standard six pupil to be able to perform well in these tasks, they should not be having any reading difficulties. The scenario where there are learners who exhibit problems in reading is what led this study to target such learners and to investigate their phonological awareness skills because literature shows that there is a close link between phonological awareness and acquisitions of reading skills.

For a researcher to collect information about a group of persons or things that will give an accurate picture, the best way is to examine every single member or element of the group. This is a common practice in natural sciences and social sciences (Kasomo, 2006). One of the main methods of sampling in social sciences is judgmental or purposive sampling. This is the type of sampling which entails identifying in advance the target variables for a specific purpose. This presupposes the type of respondents to be studied (Punch, 2009). It is pointed that if the research questions highlight relationships between variables or comparison of groups, then judgment or purposive sampling is appropriate since it makes sense to select the sample in such a way that there is maximum chance for any relationships to be observed (Punch, 2009).

To select respondents who fitted into this study, the researcher went to two schools in each of the eight divisions in Nairobi County. The class teachers in the selected schools assisted the researcher in identification of pupils with reading disorders. The class teachers based their selection of these pupils on their performance in the end term examinations. Because this was not the best way to establish if a pupil had reading disorders, the researcher went ahead to administer a reading assessment test to the pupils (see appendix IX). This test was administered to satisfy the respondents' inclusion criteria. The reading assessment test had 72 items, the first 8 being sounds of English and the remaining 64 being words. The

students who scored below 30 were considered to have reading problems thus they were selected as respondents in this study. Out of the 65 pupils identified as having reading problems, 25 scored below 30 and were thus included as respondents in this study.

Some researchers normally face the challenge of determining the size of the sample necessary to achieve the objectives of the planned study. It is recommended that researchers use the largest sample possible because statistics calculated from a large sample are more accurate. Kasomo (2006) suggests that for correlation research, 30 cases or more are required and for descriptive studies, 10 percent of the accessible population is enough and for case studies, one case or multiple cases can be used. This study looks at individual respondent's reading problems and each could be called a case. This is because people with reading disabilities do not exhibit similar characteristics of the disorder. Thus, a sample size of 25 respondents was considered sufficient enough for an effective study.

3.4 Pilot Study

The pilot study was conducted in Kahawa Garrison Primary School. Ten pupils identified as having reading disorders on the basis of the reading pre-test were engaged in the pilot study. The researcher then administered to the selected pupils the five phonological awareness sub-tests which contained 24 items. The purpose

was to familiarise with the administration of the test, to assess the suitability of the items in the tests and also to assess the applicability of the test items in an attempt to ensure the reliability of the test and the validity of the test items.

3.5 Research Instrument

Five subtests testing on phonological awareness were used in data collection. The data obtained were tape recorded and later transcribed.

3.5.1 Classification of Tests

There is no single standard set of test that measure phonological awareness (Cardenas, 2009). Typically, five types of skills are included in the domain of phonological awareness. The tests in this study were adopted from the work done by Levis, et al., (2007) and were modified to suit this study. These tests are described one after the other here.

A) Non-word Reading Test

The Non-word reading test consisted of fifteen meaningless but phonologically legal three to four strings (pseudo words). The word patterns used in these pseudo words are existing morphophonemic patterns and reflect all possible combinations of letters and vowels. The respondents were asked to read the non-words aloud.

During this exercise, the respondent was tape recorded. The researcher also had a copy of the test which was marked for correct readings and incorrect readings. The data was used in analysing the respondents' pronunciation of the vowel sounds and the consonant sounds in the fifteen items in the test items (see Appendix I).

B) Phonological Production Test

In this test, the respondents were instructed to come up with five words starting with the phoneme that was specified by the researcher. Eleven phonemes were arbitrarily selected to help generate fifty five words. This does not mean that the eleven phonemes are more special than other phonemes of English. This test was to test the respondent's ability to generate lexical items that began with the sounds given. The phonemes used in this task were: /d/ /b/, /k/, /m/, /g/, /s/, /æ/, /ɔ/, /e/, /ʊ/ and /i/. A target of 55 words was expected from each respondent (see Appendix II).

C) Phonological Manipulation

Phoneme manipulation is the ability to add, delete, substitute, or rearrange phonemes or groups of phonemes within a word. Three tasks were used to measure this level of phonological awareness skill in this study.

i) Initial Consonant Identification

Respondents were presented with ten words. In the first part of this test, they were to listen to one word at a time then tell the researcher aloud what the first sound of the word was. For example, the first sound of the word 'frog' is /f/. In the second part, they were presented with a word and its truncated part. They were to identify the missing sound at the beginning of the truncated part. These were to test their ability to identify sounds from words.

ii) Final Consonant Deletion

This test is similar to the initial consonant identification task described above, except that the respondents were supposed to identify the final consonant. Five words and their truncated parts were used in the task (see Appendix III).

D) Phonological Segmentation

Phonological segmentation is the ability to decompose a word into phonemes and syllables. The respondents were presented with words one at a time and were asked to tell the researcher the sounds that made up the words and to give the number of sounds in each word. Five words were used in this test with the target response expected by the researcher being 17. This is the total number of the phonemes in all the five words (see Appendix IV).

E) Phoneme Blending

Phoneme blending is the ability to combine phonemes into syllables and syllables into words. A phoneme blending task in which the respondents are to hear a sequence of isolated sounds with a short pause between them, for example, /kæt/ was used to measure the phoneme blending ability of the respondents. The respondents were to say aloud a word that is made up of the sequence of the sounds they heard from the researcher. In order to be counted as correct, the pronunciation was to be correct. For example /bæk/ required the response 'back'. Eight items were used as presented in this subtest. According to the researcher's knowledge, there were no items that would present challenges to the respondents either because they were unfamiliar or complex. The focus in this study was on the vowel sounds and the consonant sounds found in the words in this particular test, thus 26 items were to be focused on (see Appendix V).

3.5.2 Reliability of the Instrument

The reliability of the tests in which the test items has the ability to be repeated needed to be considered. Reliability according to Ary, et al., (2006), refers to "the degree of consistency with which a measuring instrument measures whatever it is meant to measure." (p.254). When the instrument was being pilot tested, it was necessary to focus on the inclusion of several items pertaining to a particular phonological awareness measure. Each subtest in the instrument was asked in a

different way in order to obtain a similarity in responses. A consistency of responses was required to obtain higher degree of reliability. Internal consistency was considered in the subtests as the instructions in the tests would require a response similar or in direct opposition from the respondents on the test. Split-half method was used to group the scores into even number scores and odd number scores. These scores were computed in SPSS to obtain Cronbach's coefficient. The instrument had Cronbach coefficient alpha of 0.75. Ary, et al., (2006) indicate that a coefficient above 0.70 is considered sufficient for most researches.

3.5.3 Validity of the Instrument

Validity is a significant factor for consideration when designing and implementing a test instrument. Ary, et al., (2006) define validity as "the extent to which scores on a test enables one to make meaningful and appropriate interpretations" (p.242). Content validity was established as the instrument was being developed. Each of the items on the instrument was extracted from the information obtained from the literature review which related directly to the questions that were contemplated for this study. Researchers have listed the subtests of phonological awareness to be the appropriate measures of testing phonological awareness. For example, a connection to these instrument items can be made to an article by Kirby, et al., (2003) who wrote that, "there is considerable evidence that phonological

awareness is a key component in the development of reading ability and that poor PA is a, or perhaps the core deficit in reading disability.”

The phonological awareness subtests are also used by Levis, et al., (2007) to measure phonological awareness. The wordings of the questions and the phonological awareness measures were given careful consideration by the researcher in developing the test instrument. The instrument developed had the potential to adequately represent the phonological awareness measures that were the focus for the study outcome. A pilot study was done to ensure that the questions and the skills being tested were clear and coherent. Construct validity was established using factor analysis. The scores of the respondents were used to compute the analysis in SPSS to get the validity index of the instrument as 0.89, this value is within the recommended range of 0.70 that Ary, et al., (2006) gives as the required minimum validity of research test.

3.6 Data Collection Procedure

The head teachers and the class teachers of the schools visited were useful in helping the researcher to get pupils to participate in this study. The head teacher introduced the class teacher to the researcher. The head teachers and the class teachers were assured that the study was being conducted for the sole purpose of writing a PhD thesis and that the data collected would be treated with utmost

confidentiality. They were also assured that the research was aimed at only identifying pupils with reading problems so that findings from the research would suggest ways of addressing such problems so as to enable all pupils to continue with their learning without reading difficulties. They were told that the need to identify reading problems and coming up with intervention strategies would help pupils because reading is a skill required by pupils in all the subjects. Pupils cannot perform better in academics if they cannot read and comprehend the learning materials. After these explanations, the teachers became comfortable and agreed to allow the study to be conducted in their schools.

The class teacher then organised a room where the collection of data was to be conducted. They also helped in calling the respondents into the rooms that were set aside for the researcher to conduct this process. The tasks were explained clearly to the respondents to make sure that they understood what was required of them. The researcher then showed the respondents the tape recorder and told them to talk into it and be tape recorded. The recording was then played back to them so that they would become familiar with tape recording process and thus reduce the effect of the observer paradox. After the above steps and after gaining the attention of the respondent, the researcher began the collection of the data.

Each respondent was tested individually in a relatively quiet room at their school. There were 20 minutes testing sessions for each learner per day. During the first

session, each respondent was given the non-word reading task followed by the phonological production test. During the second session, phoneme blending and phonological manipulation tests were administered. In the third session, the phoneme segmentation test was given. During these sessions, the readings done aloud by the respondents were tape recorded. The researcher used the hard copy of the test in marking the tests, putting a tick (√) where the word or sound was correctly articulated or a mark for incorrect (×) where the articulations were not the target. The correct score was awarded (1) mark and the incorrect score was awarded (0) marks. The time spent by a respondent in answering the tests was arrived at after listening to the tape recordings. For example, the researcher would listen to the recording from non-word reading test and then note it down. This was done for all the 25 respondents in all the five subtests. The data was used to explain the significance of naming speed in reading.

3.7 Data Analysis and Presentation

The data for the study was in linguistic forms, that is, words and sounds and also in terms of scores which were summarized and described using descriptive statistics. Non-numerical data can be in the form of words and expressions (Mugenda & Mugenda 2003). These data can be written texts, transcripts of conversations or interviews, tape recordings and field notes (McNabb, 2004). This study had tape

recordings and the researcher's notes. These categories of data were analysed and discussed in prose.

3.7.1 Transcription of Data

After all the visits, the researcher played back the tape recordings to ascertain that they were clear and sufficient for the purpose of the study. All the tape recordings were clear except the recording of one student who spoke in very low tone thus transcription of this respondent's recording was a bit involving and took quite some time to transcribe. This is because the researcher was forced to play back and forth to ensure that the articulations of the respondent were accurately captured.

The transcription focused on the phonological awareness measures: non-word reading, phonological production, phonological manipulation, phoneme blending and phonological segmentation. Data from these categories were summarized and analysed to determine the respondents' phonological awareness skills. The respondents' pronunciations that were different from the target expectations from each phonological awareness tasks were analysed as deficits in phonological awareness. These mis-articulations were presented and discussed under categories such as: substitution mis-articulations, phoneme deletion, phoneme insertion, atypical mis-articulations and segmentation mis-articulations.

3.7.2 Data from the Tests

All the tests in this study required marking. As the respondents were reading the test items loudly as per the instructions, the researcher was marking the items that they got correctly and those that were incorrect. Scores were awarded in each task. The tests were marked and scores tabulated. Descriptive statistics which is defined as the measures or numbers used to summarize and describe data sets was used. Descriptive statistics include measures of central tendency (mean, median, and mode), and measures of correlation among others (McNabb, 2004).

The present study used the mean, range, frequencies, and percentages to address the various objectives of the study. The mean is the most common measure for describing the location of a set of data. It can be used to estimate the central point of a sample (Davies, 2007). The range is simply the difference between the higher score and the smaller score. It is used when making a rough comparison of two or more groups for variability.

The percentages relating to various aspects in this study were worked out. The percentages computed in this study were on the scores of the respondents in the various tests, the percentages of the respondents who were male or female and the percentages of the ages of the respondents in the study. Frequencies were used in summarizing the scores of the respondents. This helped the researcher in

calculating of percentages. For example, the frequencies of the students who scored the highest marks or those who scored the lowest. The time it took each respondent to perform each task was also captured. This was elicited from the tape recordings. Time was presented in terms of the minutes a respondent took in completing a task. This data was used to explain the notion of rapid automatic naming in reading. The mean of time the respondents took in the phonological awareness tasks was then calculated.

3.8 Ethical Considerations

McNabb (2004) points that any research, especially one involving human subjects, is liable to forces emanating from the ethical environment. Research ethics should, therefore, be treated as a vital aspect of research. McNabb (2004) defines research ethics as the application of moral standards to decisions made in planning, conducting and reporting the results of research studies. The Following ethical issues were considered.

3.8.1 Permission to Collect Data

A research permit was obtained from the National Council for Science and Technology in the Ministry of Education- Kenya. A copy of research proposal complete with an abstract describing the nature of the study were given to the officials at the council as part of the procedure in getting the research permit.

Before proceeding to schools, the researcher was advised to get another permit from the Nairobi City Council Education offices. The researcher met the director in charge of all primary schools in Nairobi County who issued another permit to the researcher. Permission to proceed with the study was also granted by Graduate School of Kenyatta University.

3.8.2 Ethical Issues in Data Analysis

The stage of processing and interpretation of data requires honesty in the interpretations made from the data. All the conclusions made should stem from the data. The data should not be used to give credence to some pre-established conclusions. The data from the present study were entered into the computer as presented by the respondents. Statisticians were involved in computing results. The data collected was analysed without trying to alternate them to fit into any preconceived conclusions.

3.8.3 Informed Consent

The rights of the respondents are protected through debriefing and informed consent. (See Appendix X). The National Special Needs Education Policy (2009) states that Education, Assessment and Resource Centres (EARCs) is mandated to identify, assess, provide intervention and placement of learners with special needs and disabilities. Parents and the community are also primary in the process of

identification. The present study requested teachers to help in the identification of the respondents for the present study. To engage the identified pupils in the study, consent was sought from their parents. The purpose of conducting the research was explained to the parents and the teachers. Each parent was informed that his/ her child's participation in the research was voluntary and that he/she was free to withdraw his/ her child without fear of being penalised by the researcher or the school. Each parent confirmed that his/her child did not have hearing or sight problems.

3.8.4 Confidentiality and Anonymity

To ensure confidentiality and anonymity, both the respondents and the school were allocated code numbers. The parents and the teachers were assured that the information would be treated with utmost confidentiality. No respondent or school would be identified in the report.

3.8.5 Protection of the Respondents from Harm

The present research did not pose any harm to the respondents. There respondents were not exposed to any kind of stress. The researcher was very friendly to them during the entire process.

3.8.6 Benefits

The respondents and the teachers did not receive benefits of any kind. The parents were advised to read together with their children and take them to EARCs for further assessments. The research finding would benefit teachers of reading, speech and language therapist in using phonological awareness in the training and intervention programmes for learners with reading disabilities.

3.9 Summary of the Chapter

This chapter has presented description of research design and the methodology that guided this study. The study employed a descriptive research design which entailed discussion of data in prose and the use of descriptive statistics to analyse the numerical data. The chapter further describes purposive sampling as the sampling method used in the present study. The chapter also describes the data collection procedures explaining that tests and tape recordings were the instruments used. Moreover, the chapter also provides the ethical considerations that were observed in the study.

The next chapter deals with the nature of phonological awareness skills of the respondents in the phonological awareness sub-tests.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.0 Introduction

The present study set out to investigate the phonological awareness skills of class six learners with reading disabilities. The data presented and analysed in the present chapter are the respondents' responses to various Phonological Awareness Sub-tests. These responses guided the present study in discussing the objectives of the study

The present chapter presents the results of the study in relation to the objectives set out in section 1.7. The first part discusses the nature of phonological awareness skills of class six learners with reading disabilities. The second part presents the difficulty levels of the measures of phonological awareness skills and the last part evaluates the significance of naming speed in reading.

4.1 The Nature of Phonological Awareness Skills of the Respondents

This section deals with data presentation, analysis and interpretation in line with the first objective of the present study which was: to determine the nature of phonological awareness skills of class six learners with reading disabilities. Section 4.1.1 gives a brief discussion of the nature of phonological awareness.

Section 4.1.2 discusses the various mis-articulations that portray the nature of phonological awareness of the respondents in the present study. Five sub-tests of phonological awareness were used to test this awareness. These articulation mis-articulations are exemplified and explained. Section 4.1.3 gives a summary of the chapter.

4.1.1 The Nature of Respondents' Phonological Awareness

The phonological awareness theory (as dealt with in chapter 2) shows that phonological processing skills differ with respect to linguistic complexity (e.g. words, syllables, onset and rimes and phonemes) or the type of the cognitive operation required (e.g. detection, blending, segmentation and manipulation). It also gives the patterns of phonological awareness development which are indicated to develop from the lower levels of phonological awareness (e.g. rhyming) to the higher level phonological awareness (e.g. segmentation); (Anthony & Francis, 2005).

The present study approached the investigation from a phonemic point of view in the endeavour to determine the nature of the respondents' phonological awareness skills. This is with the assumption that children in class six, which the study established to be between the ages of 12 and 15 year olds, should not be experiencing reading difficulties because they have been taught how to read in the lower primary classes. A number of scholars argue that at age seven, children

begin to spell phonetically. They can segment three to four phonemes in words. Many seven year olds can complete phoneme deletion tasks, that is, they are able to delete sounds from words (e.g. “moose” without the /s/ is “moo” (Goldsworthy, 1998; Justice & Schule, 2004).

From the summary of the development of phonological awareness at the age levels, it should be expected that children who are above 8 years old and regularly attend school should not experience difficulties in tasks involving phonological awareness. The respondents in this study were between the ages of 12 year olds and 15 year olds and were, therefore, expected not to exhibit any mis-articulations that portray their lack of phonological awareness. This study established that this was not the case with most of the respondents.

The phonological awareness theory also suggests the various tasks that can be used in determining the learners’ skills in phonological awareness. These tasks include: rhyming, counting the number of phonemes in words, matching sounds in words, isolating sounds in words, deleting phonemes or syllables from words and blending phonemes to produce words and non-word reading and segmenting words into their constituent sounds (Anthony & Lonigan, 2004). The present study used a blend of these tasks. They included: non-word reading, phonological manipulation, phonological production, phoneme segmentation and phoneme blending to test the

respondent's nature of phonological awareness. The next section exemplifies and explains the mis-articulations exhibited by the respondents.

4.1.2 Mis-articulations in the PA Tests

Responses of the respondents were categorised into various forms of mis-articulations after the transcription and the analysis of the tape-recorded data. The theory of phonological awareness indicates that a child who is able to perform the various phonological awareness tasks that involve sound blending, manipulation, and segmentation of words into phonemes will also have good word decoding abilities that are vital in fluent reading. Deficits in any of the phonological awareness skills are likely to result into disordered reading. The deficits of phonological awareness referred to as mis-articulations in the present study were categorized as follows: Substitution; Letter Names; Phoneme Insertion; Phoneme Deletion and Atypical. These mis-articulations are thus exemplified and discussed in the sections that follow.

4.1.3 Substitution Mis-articulations

The substitution mis-articulations are discussed in two categories in this study. These are articulation substitutions involving consonant sounds and those involving vowel sounds.

4.1.3.1 Substitution of Consonant Sounds

Consonant sounds are classified according to some of the following distinctive features: manner of articulation, place of articulation and voice (Roach, 2009). Substitution mis-articulations observed in this study revolve round these three properties. During articulation of words, the substitution of any sound based on these distinctive features will result in a word which is not the target. Such substitution mis-articulations realised in the present study have been grouped into these three categories then explained. It should be noted that there could be an overlap of these properties while explaining the nature of the substitution.

(i) Voicing Mis-articulations

Consonant sounds are termed as “voiced” if their articulation involves vibration of the vocal cords and “voiceless” if during their articulation, there is no vibration of the vocal cords. The examples below were classified under “voice” because the changes in words depended on whether the sound involved was voiced or voiceless.

Table 4.1: Voicing Mis-articulations

Target Sound	Substituted With	Example of words
/θ/ (- voiced)	/ð/ (+ voiced)	<u>Th</u> ed- / <u>ed</u> /
/b/ (+ voiced)	/p/ (- voiced)	<u>b</u> oy- / <u>b</u> ɔɪ/ , <u>se</u> b / <u>se</u> b/
/t/ (- voiced)	/d/ (+ voiced)	fo <u>o</u> t -/fo <u>u</u> t/
/g/ (+ voiced)	/k/ (- voiced)	w <u>a</u> g -/w <u>a</u> g/

The sound /θ/ was substituted with the sound /ð/ in the non-word “thed” transcribed as /θed/. The sound /θ/ and /ð/ are produced in the same place of articulation. They are both dental sounds. However, the consonant /θ/ is voiceless and the consonant /ð/ is voiced.

The respondents were to identify the first sound in the word /bɔɪ/. The sound /b/ was substituted with the sound /p/. This led to the word /bɔɪ/ being articulated as /pɔɪ/. The sounds /p/ and /b/ are produced in the same place. They are bilabial sounds. However, in terms of voicing, /b/ is voiced while /p/ is voiceless. Substitution of either in a word thus results in a change in the word articulated.

Another example is where the respondents were required to identify the last sound in the word “foot” transcribed as /fɒt/. The sound /t/ was substituted with the sound /d/. The response from the respondents was “food”. The sounds /t/ and /d/ are produced when the blade of the tongue comes into contact with the alveolar ridge.

They are thus called alveolar sounds. While /t/ is voiceless alveolar stop /d/ is its voiced counterpart. The last example here is that of the non-word “wag” transcribed as /wag/. In its production, there was a response “wak” which has /k/ as the last sound instead of /g/ which is in the target non-word. These two sounds /k/ and /g/ are velar sounds. They only differ in the property of voicing. /k/ is a voiceless velar stop while /g/ is its voiced counterpart. It is, therefore, observed that the respondents had a problem in distinguishing the voiceless phonemes from the voiced ones. For example, saying “wak” instead of “wag”.

(ii) Mis-articulations due to Place of Articulation

Consonant sounds are produced along a continuum based on the movement of both the active and passive articulators within the vocal tract. These sounds are classified depending on the position within the vocal tract where constriction takes place during articulation. For example, /p/ is bilabial, /t/ is alveolar and /g/ is velar. Mis-articulations that were as a result of the substitution of sounds produced in different places are summarised in Table 4.2.

Table 4.2: Change of Place of Articulation Mistakes

Target Sound	Substituted with	Example of words
/b/	/d/	seb- /seb/, blon- /blɒn, doom-/du:m/
/d/	/b/	trud-/trud/, /trub/
/n/	/m/	Simfrɒn- /simfrɒn/, /sinfrɒm/
/s/	/ʃ/	ʃnel -/ʃnel/, sheep -/ʃip/, shake -/ʃeik/

The consonant /b/ was substituted with the consonant /d/ in the non-word “seb” and “blon”. This led to production of words such as “sed” and “dlon”. The consonants /b/ and /d/ are stops. However, they are produced at different places within the vocal tract. The sound /b/ is produced when the lips come into contact thus it is a bilabial sound whereas the sound /d/ is produced when the blade of the tongue comes into contact with the alveolar ridge. Because they are somehow similar, the substitution of one for the other can be termed a case of reversal which is common in the reading of children with reading disabilities. This is also demonstrated in the articulation of the word “trud”. Respondents replaced the sound /d/ with /b/ to read the non-word as /trub/.

Another example is that which involved two nasal sounds /m/ and /n/ in the non-word simfron /simfrɒn/. The two nasal sounds are produced when the velum is lowered then air is allowed to escape through the nose. Their places of articulation are different; /m/ is a voiced bilabial nasal whereas /n/ is a voiced alveolar nasal. These two nasal sounds are used in the same word; it is not easy to tell why the respondents articulated /m/ instead of /n/. For example, instead of reading the target word /simfrɒn/, there were responses as /sinfrɒm/.

The final example in this part involves the sounds /s/ and the sound /ʃ/ as was read in the non-word “snel” and the English words “shake” and “sheep”. The two sounds /s/ and /ʃ/ are voiceless fricative sounds. However, the sound /s/ is

produced when the tip of the tongue comes into contact with the alveolar ridge. The sound /ʃ/ is produced with the blade of the tongue against the post-alveolar region. The use of either sound in place of another usually results in a change of meaning. For example, in the Phonological Production test, the respondents were told to produce five words that began with the sound /s/. Some of the responses were: “sheep”, “shake” and “she” which all begin with the sound /ʃ/ and not /s/.

(iii) Mis-articulations due to Changes of Manner and Place of Articulation

Under this section, examples of mis-articulations that were as a result of a combination of two distinctive features: manners of articulation and places of sound production are given and discussed. Place of articulation has been briefly explained above. Manner of articulation is the nature of constriction that takes place when the sounds are being produced. A sound can thus be classified as a stop, a fricative, a lateral and an affricate just to mention a few. Examples of mistakes of this nature are given in the Table 4.3.

Table 4.3: Manner and Place of Articulation Mis-articulations

Target Sound	Replaced with	Example of words
/r/	/l/	ruk /ruk/
/ʃ/	/ʒ/	shob -/ʃɔb/
/f/	/p/	phim /fim/

As shown in the table above, the sound /r/ was replaced with the sound /l/ in the non-word “ruk” transcribed as /ruk/. This made the resultant non-word be “luk”. Even though the sound /l/ and /r/ are voiced, the sound /r/ is called an alveolar approximant while /l/ is called a lateral approximant. A substitution of one of these two sounds in the same word position leads to new words with different meanings.

The second example involves the sounds /ʃ/ and the sound /tʃ/. The sound /ʃ/ is a voiceless post-alveolar fricative whereas the sound /tʃ/ is a voiceless post-alveolar affricate. Both sounds are represented in orthography by diagraphs <sh> for /ʃ/ and <ch> for /tʃ/. However, they are realised as individual sounds though the phonetic symbol for <ch> contains two symbols. The affricate /tʃ/ is a stop released into a fricative. The substitution of the sound /ʃ/ with /tʃ/ brings forth a change in the structure of the non-word /ʃɔb/ to /tʃɔb/.

The last example is that which involves substitution of the sound /f/ with the /p/. This happened in the articulation of the non-word “phim”. The consonant in the onset of the non-word was to be articulated as /f/. There were instances where the respondents articulated the target word as /pim/. The sound /f/ is a voiceless labio-dental fricative whereas the /p/ is a voiceless bilabial stop. The respondents who read “phim” transcription /fim/ as /pim/ lack the awareness that there are words that contain diagraphs (which are two letters in the spelling) of a word but are realised as one sound in actual speech.

4.1.3.2 Substitution Mis-articulations with the Vowel Sounds

Correct articulation of English vowels is normally a big challenge for children and even adults whose first language is not English (Chen, 2009). For one to be able articulate these vowels correctly he or she would need to practice their (vowels) articulations in various English words.

i) Parameters used in Identifying Mis-articulations of Vowels

According to Roach (2009), there are different parameters used to classify vowel sounds: vertical tongue height, horizontal tongue position and the shape of the lips. In terms of vertical tongue height, a vowel sound can be said to be high, mid-high, mid-low or low. In terms of horizontal tongue position, a sound can be said to be front, central or back. In relation to the shape of the lips, a sound is either spread, round or neutral. These parameters are used in describing the substitution mis-articulations involving the use of vowel sounds in this study.

Table 4.4: Vowel Classification Mis-articulations

Target Sound	Substituted with	Example
/e/	/ɪ/	S <u>e</u> b
/b/	/ʊ/	<u>y</u> ok, b <u>a</u> ll
/ʊ/	/ɑ/	tr <u>u</u> d, r <u>u</u> k
/ʊ/	/ʌ/	<u>u</u> mbrella, <u>u</u> nder

The Table 4.4 above gives examples of the target sounds and the sounds that they were substituted with, in the Non-word Reading task and the Phonological Production task. The first example is the one which involves the substitution of the front mid-high spread vowel /e/ with a front high spread vowel /ɪ/. Articulations of either sound in place of the other results in a different sound and can even change the meaning of a word. For example, the substitution of the vowel /e/ with the vowel /ɪ/ in the non-word “seb” leads to a new non-word “sib”.

The second target vowel was the mid-low back round vowel /ɒ/. It was substituted with the high back round vowel /ʊ/. Both of these vowels are, therefore, back and round. But a substitution of /ɒ/ with /u/ resulted in the non-word /jɒk/ being read as /jʊk/ and ball- /bɒl/ read as /bʊl/. The third example involves the sounds /u/ and /a/. The vowel /u/ is high back round vowel while /a/ is a low front spread vowel. The replacement of /u/ with /a/ in articulating the non-word /trʊd/ ended up with a non-word /trad/ and /rɒk/ was also read as /rak/. It can be assumed that the respondents were transferring their knowledge of sight word vocabulary to read these words. This is, because, in many words in English orthography, that have the letter “u”, the ‘u’ is mostly pronounced as /a/.

The fourth example is that of the vowels /ʊ/ and /ʌ/. The vowel /ʊ/ is a back high round vowel while /ʌ/ is a mid close central neutral vowel. Substitution of /ʊ/ with /ʌ/ resulted in articulation of words such as “umbrella”, “under” just but to

mention a few. Here the respondents were applying their letter knowledge to tackle the task rather than providing the words which began with the sound /ʊ/. A transcription of the words “umbrella” and “under” reveals that the initial sound at each of the words is the sound /ʌ/. These examples were a manifestation that the respondents experienced difficulties in identifying the appropriate vowel phonemes in the target non-words and in the Phonological Production task where they were expected to come up with words that began in the vowel sounds given as test items.

i) Short versus Long Vowels

These are substitutions that were as a result of a change of the quality of the vowel from the short vowel expected in the target to a long vowel in the Phonological Production task. This is exemplified in Table 5.5 below.

Table 4.5: Substitutions of Vowel Length

Target Sound	Substituted with	Example of words
/æ/	/ɑ:/	artist, aunt
/æ/	/ɔ:/	author, audience
/ɒ/	/ɔ:/	orphanage, orderly
/e/	/i:/	eagle, easter

A change in the meaning of an English word can stem from the length of the vowel used in the word. The sound /æ/ is a short front mid-low vowel. It was substituted with the long vowel /a:/ when respondents were instructed to produce English words that began with the vowel /æ/. Examples of the words they produced were “artist” transcribed as /a:tɪst/ and “aunt” transcribed as /a:nt/. Another substitution mistake realized with the sound /æ/ was where respondents produced words that began with the long vowel /ɔ:/ examples of words given were: “author” and “audience”. A transcription of these two words reveals that the initial sound in the words is the long /ɔ:/ (author -/ɔ:əθ/ and audience - /ɔ:dɪəns/. The short vowel /ɒ/ was also substituted with the long vowel /ɔ:/ The responses given by the respondents were: orphanage and orderly. A transcription of these two words also shows that they begin with the long vowel /ɔ:/ instead of the short vowel /ɒ/ (e.g. “orphanage” - /ɔ:fənɪdʒ/ and “orderly”- /ɔ:dəlɪ/. The last example in this section is where the responses that were expected were to begin with the mid-high front vowel /e/. Some of the words produced did not have the sound /e/. This was substituted with the long vowel /i:/. Examples are: “eagle” - /i:gl/ and “easter” - /i:stə/. These mistakes are a confirmation that the respondents’ letter knowledge does not correspond to the sound knowledge. A child with good phonological awareness will be aware of the sounds in a word in addition to knowing the letters that make up that word. This is called letter-sound knowledge (Arrow, 2007).

ii) Short Vowels versus Diphthongs

Apart from the short vowels and the long vowels, English also has diphthongs. Diphthongs are instances where there is a glide from one vowel sound into another. Articulating a diphthong in a word contains a short vowel or a long vowel results in mispronunciation.

Table 4.6: Short Vowels Substituted with Diphthongs

Target sound	Substituted with	Example of words
/ɪ/	/aɪ/	Hik
/ɪ/	/eɪ/	Plin
/æ/	/eɪ/	aeroplane, age
/ɒ/	/əʊ/	oval, opaque

The short vowel /ɪ/ was substituted with the diphthong /aɪ/ in the articulation of the non-word /hɪk/. This resulted in the word /haɪk/ -“hike” which is an English word while the respondents were required to read aloud the non-word. Another example is where the sound /ɪ/ was replaced with the sound /eɪ/ to articulate the non-word /plɪn/ as /pleɪn/. Moreover, there was a mis-articulations made in producing sounds that began with the sound /æ/. /eɪ/ was used instead of the short vowel /æ/. Examples were: “age” - /eɪdʒ/ and “aeroplane”- /eɪrəpleɪn/. Lastly, the short vowel /ɒ/ was substituted with the diphthong /əʊ/ when respondents were producing words which began with the short back mid low round vowel /ɒ/. Examples of such words were: “oval” - /əʊvəl/ and “opaque” - /əʊpeɪk/.

4.1.4 Letter Naming

The mis-articulations of naming letters instead of articulating the sounds was realized more in the Phonological Manipulation test than any other test used in this study. In the Phonological Manipulation test, the respondents were expected to identify the first sound, the missing sound and the last sound in the English words given (see Appendix III).

Table 4.7: Target Sounds and Letters

Target Sound	Letter	Target Sound	Letter
/b/	b	/dʒ/	j
/k/	c	/t/	t
/d/	d	/n/	n
/f/	f	/p/	p
/g/	g	/s/	s

As shown in Table 4.7, the respondents identified the letters instead of the sounds that appeared in word positions which they were to identify. Even though this is not a clear demonstration of phonological awareness, literature shows that letter knowledge is a key component in training children how to read (Arrow, 2007 and Dahmer, 2010). The letter knowledge is normally acquired through the phonics approach. When phonics approach is combined with teaching of phonological awareness, studies show that this would enhance children's reading abilities. The

combination of the two can also be used in the intervention programmes for children with reading disabilities (Ehri, et al., 2001b; National Reading Panel, 2000). From Table 4.7, it can also be observed that the respondents had a challenge of identifying the first sound in the word “computer”, they identified it as <c> instead of /k/ (see Appendix III).

4.1.5 Phoneme Insertion

In the Phoneme Manipulation test, the respondents were expected to identify the initial sounds in words, missing sounds and the last sound. This was the test where there were numerous insertions of the vowels in identification of various consonants (See Appendix III).

Table 4.8: Phoneme Insertion Mis-articulations

Target Sound	Phoneme Inserted	Examples of articulations
/b/	/ɒ/	/bɒ/
/f/	/ɪ/	/fɪ/
/f/	/aɪ/	/faɪ/
/dʒ/	/a/	/dʒa/

While identifying the sounds in the initial position of the word “boy”, the back mid-low round vowel /ɒ/ was inserted so that the respondents’ answer was /bɒ/. In identification of the first sound in the word “five” which is /f/, the respondents inserted the front high spread vowel /ɪ/ and the diphthong /aɪ/ as shown in the table above. The last example here involved the articulation of the first sound in the word “jump”. When this word is transcribed, the sound that appears at the initial position is the post-alveolar affricate /dʒ/. The front open low vowel /a/ was inserted after /dʒ/ so that their response was /dʒa/.

The mis-articulations presented here are not serious phonological awareness problems (McBride – Chang, 1999). The vowel sounds that are inserted after the target phonemes tend to influence the way the respondents articulated the phonemes. Even though this shows no serious identification problems, it is noted that these respondent are lacking in the awareness of the segments that should go into the different parts of a syllable. A syllable has an onset and a rime. The onset is the initial consonant sound in a word.

The rime is made up of a nucleus and a coda. A vowel is the nucleus of a syllable while a coda is a consonant sound terminating the syllable. When a child is aware of the onset and the rime, he or she will segment a word into the categories of onset and the rime. The examples in Table 4.8 show that the respondents were not aware that the onset of a word should only contain the initial consonant sound and

that the vowel sound is part of the rime. When teaching phonological awareness skills to children, they should be made aware of how to identify the sounds that go to the onset and the ones that are part of the coda. Such awareness has been shown to aid the children in acquiring reading competence (Lonigan, et al., 2000; Tunmer & Chapman, 2007).

4.1.6 Phoneme Deletion

Phoneme deletion is a phonological process where a speaker omits a sound or sounds that are expected to be articulated in a word. Mis-articulations as a result of deletion were not common in the respondents' answers. Table 4.9 gives a summary of examples of such mis-articulations.

Table 4.9 Deletion of Sounds

Target Word	Sound Deleted	Words Articulated
yok /jɔk/	/j/	ok /ɔk/
plin /plin/	/l/	pin /pin/
skad /ska/	/k/	sad /sæd/

In Table 4.9 above, it is shown that there was a deletion of the palatal approximant /j/ so that the non-word “yok” -/jɔk/ was read as “ok” and in the non-word “plin”

the lateral approximant /l/ was deleted and the word read as /pin/. Lastly, the non-word “skad” was read aloud as “sad” because the voiceless velar stop /k/ was deleted.

From these examples, it was observed that the responses were instances of recall. This could be due to the fact that the respondents were trying to recall some of the English words that might be part of their vocabulary (sight words). The words “pin” and “sad” are English words while the target words were non-words.

4.1.7 Atypical Mis-articulations

Atypical mis-articulations are instances where the respondents produce a totally different word from the target word or a distortion of the target word. They are serious manifestations of lack of phonological awareness in readers. Examples of such mis-articulations are given in the Table 4.10.

Table 4.10: Atypical Articulations

Target Word	Atypical Articulations
skad -/skad/	chair, ask, snack
chub -/tʃʊb/	child, sick, dip
keep -/kip/	cook, car, cake
ball - /bɔl/	blue, blood, bell

The target sounds in the non-word “skad” were the voiceless fricative /s/, the voiceless velar stop /k/, the front open low vowel /a/ and the voiced alveolar stop /d/. Atypical articulations made by the respondents were: “chair”, “ask” and “snack”. The non-word /skad/ has a structure of CCVC, /æsk/ has a structure of VCC, /snæk/ has a structure of CCVC and /tʃeɪə/ has a structure of CV. The production of the word /snæk/ is atypical because, one, it is an English word and two, the sounds that make it up are different from those found in the non-word “skad” except for the alveolar fricative /s/ which occurs at the onset of each and the velar stop /k/ which occur in different word positions. The word “ask” is also atypical because it has the structure of VCC while the target is CCVC and even though it contains the sounds /a/, /s/ and /k/ that are also in “skad” it is not near it in articulation. The word “chair” contains the post-alveolar affricate /tʃ/ and the triphthong /eɪə/ both of which are not found in the target non-word.

The second example of atypical mistakes is explained from the articulations that stemmed from the responses given for the non-word “chub”. The target sounds in this non-word are: the post-alveolar affricate /tʃ/, the high back round vowel /u/ and the voiced bilabial plosive /b/. The structure of “chub” is CVC. Atypical mis-articulations here were: /tʃaɪld/ - CVCC, /sɪk/- CVC, /dɪp/- CVC. All these words are English words and the target word was a non-word.

Atypical mis-articulations in the blending task were also quite many. In this section, two examples are explained. The English word “keep” -/ki:p/ was articulated as “cook”, “car” and “cake”. /ki:p/ has a structure of CVC, /kuk/ has a structure of CVC and /keik/ also has a structure of CVC. The word /ka:/however has a structure of CV. These words may also have been arrived at as a result of guess work. Lastly, in the articulation of the word “ball” -/bɔ:l/, some of the responses given were: “blood”, “bell” and “blue”. Even though they begin with the sound /b/, they are completely different from “ball”. For instance, -/bɒl/ has the structure of CVC while /blʌd/ has a structure of CCVC and two sounds in /blʌd / (/ʌ/ and /d/) are not found in the target word / bɒl/. Even though /bɒl/ and /bel/ have a structure of CVC, the vowel sounds found in their nucleus are different thus their substitutions lead to a different word with a different meaning. The word /blu:/ on the other hand, has a structure of CCV while the target word /bɒl/ has a structure of CVC. Atypical mis-articulations show very serious deficits in the respondents’ phonological awareness. They are major indicators that a child has serious reading disabilities and should thus be put into a remediation programme for speedy intervention for the child to overcome reading challenges.

4.1.8 Analysis of Mis-articulations in Segmentation

These are mis-articulations made while attempting to identify the individual sounds in the words that were given in the phoneme segmentation test.

4.1.8.1 Spelling the Words

Some of the respondents spelled the words instead of identifying the individual sounds that made them up. These respondents were aware that words are made up of letters of the alphabet. They could identify the graphemes that made the words up but they could not identify the sounds in the words. For example, the word “hand” was to be segmented into /h/, /æ/, /n/ and /d/. Some spelled it as < h >, < a >, < n > and < d >. Another example was the word “foot”. It was to be segmented into /f/, /ʊ/ and /t/ but one of the responses was < f >, < o >, < o >, and < t >. This was also a manifestation of respondents’ letter knowledge but this letter knowledge could not be transferred to sound knowledge. Such respondents lacked letter-sound knowledge which is very vital in performance of phonological awareness tasks that test on the segmenting skills at the phonemes level.

4.1.8.2 Pronunciation of the Entire Word

The task required the respondents to identify the phonemes that made up the words. 25.6 percent of the respondents opted to read the entire word instead of identifying the segments that made them up. This is an indication that phoneme segmentation is a difficult task among the phonological awareness tasks. For instance, instead of identifying the sounds in the word “knee” as /n/ and /i:/, their response was “knee”. Moreover, instead of identifying sounds in the word “friend”

as /f/, /r/, /e/, /n/ and /d/, their response was “friend”. This is evidence that the respondents lacked the phonological awareness of identifying phonemes in words.

4.1.8.3 Splitting the Word

It was noted that 32% of the respondents could not identify the individual phonemes in the words. Various mistakes were realised in the performance of the respondents. First, the most common mistake was where the respondents split the word into two with the vowel in the word combined with the initial consonant in the word and the remaining consonants grouped as a cluster. Examples, instead of identifying the phonemes in the word “hand” as /h/, /æ/, /n/ and /d/, the respondents split the word as “ha – nd”. The target sounds in the word “friend” were /f/, /r/, /e/, /n/ and /d/, the respondents split it to “fre – nd” and in the case of the word “foot” where the target phonemes were /f/, /ʊ/ and /t/, the respondents split it to “fu – t”.

The second mistake was where the respondents grouped the vowels in the word with the final consonant in the words. Examples, “n – os” and “f – ut”. These are instances where the respondents could segment the initial phonemes only but still failed to segment the other phonemes in the words.

From these observations, it is evident that the respondents were aware that words can be split but they are still lacking the phonological awareness that words can also be split further into smaller units called phonemes. This confirms the findings in literature that segmenting at the phoneme level is one of the most difficult tasks for children learning to read (Chen, 2009; Armbruster, et al., 2004). Phonological awareness is thought of as a continuum of increasing awareness and ability to manipulate increasingly segmented sub-syllabic units (Burgess, 2002). At the lower end of the continuum, children are able to distinguish and manipulate onset-rime units and at the highest end, children are able to distinguish and manipulate phonemes (Anthony & Lonigan, 2004).

4.1.9 Summary of the Section

As stated in the beginning of this section, phonological awareness mis-articulations were manifested in the responses of the respondents in the phonological awareness tests used in the present study. It is observed that substitution mis-articulations were the most common followed by the atypical mis-articulations with phoneme deletions and phoneme insertions being fewer in the tasks. The respondents also showed inadequate phonemic awareness in the segmentation task. The next section deals with the difficulty level among the various measures of phonological awareness.

4.2 Difficulty Levels of the Measures of Phonological Awareness

In this section, the focus is on the results of the performance of the respondents in the phonological awareness tests with an aim of establishing the difficulty levels of the measures of phonological awareness. This section is organized as follows. Section 4.2.1 gives the descriptive statistics for the overall tests scores. Section 4.2.2 presents the test difficulty for all the PA tests. Section 4.2.3 discusses the results of the individual tests. Finally, section 4.2.4 will give a summary of the section.

4.2.1 Descriptive Statistics of the Performance of the Respondents

Twenty-five respondents in the sample were instructed to answer all the questions from five phonological awareness sub-tests. These five sub-tests were used to elicit 2450 responses which were then categorised as per the measure of phonological awareness that was being tested. The first sub-test was the Non-word reading test. It contained meaningless but phonologically legal pseudo words. It was testing the respondents' skills of reading unfamiliar words. The Non-word Reading test elicited 375 responses. The second test was the Phonological Production test. In this test, the respondents were to generate five words which began with each of the phonemes given in the test. It elicited 1375 responses. The third test was Phoneme Blending; it was testing the respondents' ability to put together individual sounds to come up with English words. It elicited 200 responses.

The fourth test was Phonological Manipulation. This test required the respondents to be able to identify the initial sound (onset identification), last sounds (coda identification) and the missing sound from the items used in the test. It elicited 375 responses. The fifth test was Phoneme Segmentation in which the respondents were expected to identify the individual phonemes that made up the words given as the test items. It elicited 125 responses. Table 4.11 gives the overall grouped scores, frequencies and the percentages of the performances of the respondents out of the possible 98 marks.

Table 4.11: Grouped Scores of the Performance of the Respondents in the PA Tests

Grouped Scores	Frequency	Percentage (%)
10 – 19	1	4
20 – 29	1	4
30 – 39	0	0
40 – 49	7	28
50 – 59	9	36
60 – 69	5	20
70 – 79	2	8
TOTAL	25	100

From Table 4.11 above, it is evident that 64% of the respondents performed above the mean which was 52.3 (see Appendix VII). The respondents who performed below the mean were 36%. The respondent who performed poorly had a score of 14 and this was followed by another respondent who scored 25 marks out of the

possible 98 marks. 8% of the respondents had high scores in the range of 70 to 79 marks with the highest scorer getting 77 marks out of 98. Overall, it was thus observed that even though the respondents were class six learners with some reading disabilities, 64% were still able to score well in the phonological awareness task as is evident in Table 4.11 above. The present study goes further to present and discusses the performance of the respondents in the individual tests that were used in the study. Table 4.12 summarizes the respondents' overall performances in each test.

Table 4.12: Respondents' Overall Performances in Each Test. (N=25)

PA TASK	N	MINIMUM	MAXIMUM	MEAN
Non-word	25	0	14	7
PM	25	0	12	4.6
PB	25	2	8	5.52
PS	25	0	2.5	0.9
PP	25	16	47	32.64

Table 4.12 shows the maximum score, the minimum score and the mean the various sub-tests used in the present study. The first test was Non-word reading in which the respondents were to pronounce the unfamiliar words. The maximum and minimum possible score on non-word reading ranged from 0 to 15. Analysis of the results showed that the minimum score was 0 and the maximum score was 14.

The second test was Phonological Manipulation in which the respondents were to identify initial sounds, missing sounds or the last sounds from the test items. The maximum score a pupil could obtain in the Phonological Manipulation subtest was 15 and a minimum score of zero (0). Data analysis revealed results which ranged from a minimum score of zero (0) and a maximum score of 12. The mean score was 4.6.

The third test was Phoneme Blending which required the respondents to combine individual sounds to come up with words. For this test, the expected maximum and minimum scores were 8 and zero (0), respectively. Data analysis scores ranged from a minimum score of 2 and a maximum of 8. The mean score was 5.52. The fourth test was Phoneme Segmentation which required the respondents to identify the individual phonemes that made up the words used as the test items. The maximum score the pupils could obtain in Phoneme Segmentation subtest was 5 and a minimum score of 0. Data analysis scores ranged from minimum score of zero (0) and a maximum score of 2.5. The fifth test was Phonological Production which required the respondents to generate five words for each sound given in the test. The maximum expected score in Phonological Production subtest was 55 and the minimum score zero (0). After the analysis of the data in this subtest, the maximum score was 47 and the minimum score of 16. The mean score was 32.6. The next section presents the difficulty levels of the sub-tests used in the present study.

4.2.2 Difficulty Levels of the Sub-tests

The difficulty level of the sub-tests used in the present study was ranked according to the mean score obtained in each test. Because the numbers of items in each sub-test was different, a comparison between the sub-tests could be made only by using converted means (Yopp, 2000). Therefore, the results of the phonological awareness measures are compared by using converted means by averaging the correct rates for all respondents in each test. Table 4.13 shows the difficulty levels of the sub-tests used in the present study. These converted means are used to rank the tests from least to most difficult.

Table 4.13: Test Difficulty of PA Tests

Level of Difficulty	PA Tests	Mean
The least Difficult	PP	32.64
↓	NW	7
↓	PB	5.52
↓	PM	4.6
Most Difficult	PS	0.9

Table 4.13 shows that the least difficult sub-test was Phonological Production test with a mean of 32.64. This is followed by Non-word reading with a mean of 7. Then the Phonological Blending with a mean of 5.52, Phonological Manipulation

with a mean of 4.6 and the most difficult task was Phonological Segmentation with a mean of 0.9.

Based on Dechant's theory (1993), we would expect to see the rank of relative difficulty of these phonological awareness tests in the current study from the least difficult to the most difficult to be, phoneme blending, phoneme segmentation, phoneme manipulation, and pseudo-word reading. The ranking in the present study shows that there is no clear cut rule that shows the difficulty level of phonological awareness. A study that supports the phoneme segmentation is one of the most difficult PA sub-test is that done by Chen, (2009) who found that Phonemic segmenting was the most difficult task for Taiwanese children in English phonological awareness tasks. The next section gives a presentation and discussion of the results of each sub-test used in the present study.

4.2.3 Results of the Various PA Sub-tests used in the Present Study

The results on Non-word, Phonological Manipulation, Phonological Production and Phoneme Blending subtests are presented and discussed.

4.2.3.1 The Non-word Test

Non-words are not English words but are constructed based on English language phonotactics (See Appendix I). This task was used to determine if the learners

were using their phonological awareness knowledge in reading the non-words as they were presented to them with no attempt to read them like English words.

However, there were mis-articulations in their reading of the non-words that were observed after data transcription and analysis. The mis-articulations made in this task were classified into the following categories: ‘substitution’, ‘phoneme deletion’, ‘phoneme insertion’, and ‘atypical’ representing the nature of phonological problems exhibited in the readings of the respondents.

Table 4.14: Descriptive Data on the Responses from Non-word Reading Test

Responses	Frequency	Percentage (%)
Correct reading	179	47.7
Substitution	106	28.2
Atypical	61	16.3
Phoneme Deletion	10	2.7
Letter Naming	3	0.8
Phoneme Insertion	1	0.3
No response	15	4
Total	375	100%

Table 4.14 shows that 47.7% of the learners blended the sounds accurately in the articulation of the non-word as was targeted. However, when the percentages of the mis-articulations of substitution; phoneme deletion; phoneme insertion; letter naming and atypical were added, they made a total of 48.3% of the responses. 4% did not respond to the reading task. Substitution mis-articulations constitute the modal class at 28.2% in the Table 4.14 above. The least common mis-articulation

was phoneme insertion at 0.3%. Atypical mis-articulations which are considered to be the most serious manifestations of lack of phonological awareness made up 16.3% percent of the responses. Literature shows that the ability to decode non-words is a predictor of good reading (Pullen et al., 2005 & Bryne & Fielding-Barnsley 1993).

A study by Olson et al., (1992) supports the findings of the present study. They asked respondents to read pronounceable non-words from a sound symbol test. These included (bim, rayed, neap, tuaf, cedge). They also read 36 regular and 36 exception words. The 43 reading disabled and the 67 normal readers were drawn from a population of 7 to 12 years old and were divided into reading level bands, so that the reading disabled were 2-5 years older than the normal readers. Olson et al., report that at all the grade/class levels, children with reading disability performed worse than the level matched normal readers on the measures of non-word reading.

The findings of this present study agree to some extent with Olson's (1992) that the non word reading test could enable a researcher to establish the phonological awareness deficits of learners with reading disorders. It has been observed in Table 5.4 that 52.3% of the respondents had difficulties in reading the non-words. This is a clear manifestation that these respondents lack appropriate phonological awareness skills. However, the results also show that 47.7% of the respondents

read the non-words correctly. This shows that the non-reading task was not very difficult for the respondents within the 47% of the total number of the respondents.

It was also noted that individual non-words also presented different challenges to the readers. The exception was the respondent 13 who had problems in reading all the words. It was observed that a respondent could have a problem reading one non-word and have no problem in reading the others. This shows that a large number of the respondents did not exhibit a clear consistency in their reading of non-words. There were yet some respondents who failed to read. These were labelled in the tables as 'no response'. The assumption was that they had problems reading the words.

4.2.3.2. Phonological Manipulation Test

Phonological manipulation is a phonological awareness measure which requires the respondents to identify the phonemes that compose words. In this test, the respondents were required to perform three tasks. First, to identify the initial (onset) sounds in the English words presented to them. Second, to identify the last sounds (coda) in the English words presented to them. Third, they were to identify the missing sound in the English words used in this task.

i. First Sound Identification

Table 4.15 gives the frequencies and the percentages of the respondents who identified the target sounds correctly and the frequencies and percentages of those who had difficulties in identifying the target sounds.

Table 4.15: Identification of first sounds in Phonological Manipulation (N = 25)

First Sound	Incorrect Identification	
	Frequency	Percentage (%)
/k/	17	68
/b/	13	52
/f/	13	52
/d/	11	44
/g/	10	40

The percentage of the respondents who identified the first sound correctly varied from one phoneme to another. 68% did not identify the voiceless velar stop /k/ correctly. 52% of the respondents did not identify the voiced bilabial stop /b/ and the voiceless labio-dental /f/ respectively. Incorrect identification of the voiced alveolar stop /d/ was at 44% and that of voiced velar stop /g/ was at 40%.

From the transcriptions of the responses of the respondents, it was observed that the respondents used their letter knowledge to identify the first sound in the word “computer” which was the test item instead of identifying the corresponding phoneme that is realized at the initial position of the word. Respondents identified

the first sound in the word “computer” as < c > which should be realized as /k/ in articulation.

From the analysis of the transcribed data, the identifications of the sounds /b/, /f/, /d/ and /g/ were considered incorrect in instances where the respondents did not display their awareness of onsets and rimes. The English syllable has an onset which is the first consonant or consonant clusters that appear at the initial position of that syllable. The other part of the syllable is called the rime; made up of a nucleus and a coda. For example, the word “tap” is a monosyllabic word which can be divided into /t/ which is the onset and /ap/ which is the rime. The vowel sound in a syllable is thus part of a rhyme and not the onset.

When respondents were asked to identify the initial sounds of a word, they were expected to identify the onsets in the CVC structure. It was found out in the present study that 6.4% of the responses were instances where the initial sound was combined with the vowel sound that came after it. Examples of such response were: /bɔ/ instead of /b/, /fa/ instead of /f/, /da/ instead of /d/ and /gɔ/ instead of /g/. This mis-articulation is referred to in the present study as “phoneme insertion (See Table 4.8). Yopp (2000) says that the students have to develop awareness that speech sounds are objects that can be manipulated. Ability to identify individual sounds in words facilitates a reader’s decoding and encoding skills (Manyak,

2008). Student’s ability to identify initial, medial or final sounds and categorize them improves their ability to manipulate sounds (Griffith & Olson, 1992).

ii. Last Sound Identification

Table 4.16 gives a summary of percentages of the respondents’ performance in identifications of the last sounds in the phoneme manipulation test

Table 4.16: Identification of Last Sounds in Phonological Manipulation Test (N = 25)

Last Sound	Incorrect Identification	
	Frequency	Percentage (%)
/aʊə/	25	100
/n/	22	88
/p/	19	76
/s/	17	68
/t/	16	64

In this sub-test, the respondents were to identify the last sound of the test items. The last sounds could be vowel sounds in instances where the word did not have a coda. None of the respondents could identify that the last sound in the word “power” was the triphthong /aʊə/. This could mean that the respondents were relying on the letters that made up the word going by the responses they gave instead of identifying the sounds. Some of their responses were: < ower >, <wa>, < w > and < r >. English has a complex vowel system. It has short vowels, long vowels, diphthongs and triphthongs (Roach, 2009). It is evident that the respondents were not aware of the existence of such complex vowel structures thus

their responses. 88% could not identify the voiced alveolar nasal /n/, 76% could not identify the voiceless bilabial stop /p/, 68% could not correctly identify the voiceless alveolar fricative /s/ and 64% could not correctly identify the voiceless alveolar stop /t/.

iii. Missing sound Identification

Table 4.17 below gives a summary of the frequencies and percentages of responses on the identification of missing sounds from the words given in the phoneme manipulation test.

Table 4.17: Identification of Missing Sounds in Phonological Manipulation (N = 25)

Missing Sound	Incorrect Identification	
	Frequency	Percentage (%)
/p/	23	92
/s/	23	92
/m/	22	88
/t/	21	84
/dʒ/	15	60

The task on missing sound identification required the respondents to identify the sounds that should have appeared at the onset of the test items. The difference between this test and the one in the first sound identification is that two test items were presented unlike the first one that only contained one test item (see Appendix III).

92% of the respondents could not identify the missing sound /p/ found in the word ‘play’ and another 92% could not identify the missing sound /s/ found in the word ‘stop’. This was followed by 88% who could not identify the sound /m/ then 84% who could not correctly identify the sound /t/ and lastly 60% who could not identify the sound /dʒ/.

Table 4.18: Summary of the Responses from Phonological Manipulation Test

Responses	Frequency	Percentage (%)
Correct Identification	107	28.5
Letter Naming	161	42.9
Atypical	62	16.5
Phoneme Insertion	24	6.4
Phoneme Deletion	13	3.5
Substitution	6	1.6
No response	2	0.5
Total	375	100%

Table 4.18 above shows the percentages of the different categories of responses given in the phonological manipulation test. It can be observed from the Table 4.18 above that 28.5% of the respondents articulated the target phonemes correctly. A statistically insignificant figure of 0.5% did not give any response to some of the sounds. From Table 4.18 70.9% of the responses were incorrect articulations with letter naming taking the bigger percentage of 42.9% followed by atypical mis-articulations at 16.5%, phoneme insertion mis-articulations at 6.4%, substitution mis-articulations at 1.6% and phoneme deletion mis-articulations at 2.7%. It can be

observed that phonological manipulation test was difficult for the respondents. However, it may be pointed out further that these respondents lacked knowledge in letter- sound correspondence. They were expected to identify the sounds that corresponded to the letters that were used in the orthography of the words given (see Appendix III).

The results in (Tables 4.15, 4.16 and 4.17 in this section) show that the learners had problems in the identification of the first sound, the last sound and the missing sound in the words that were read aloud to them. Of the three parts of the test, learners performed dismally in identification of the last sound. This performance is replicated also in the identification of the missing sound. In the first sound identification, the result was much better. It can be noted therefore that, of the three tasks, first sound identification was easier for majority of these respondents than the other tasks in this test.

Studies reveal that children identify the initial phoneme with fewer errors than the final phoneme (Stage & Wagner, 1992; Treiman, et al., 1993). Treiman, et al., (1993) proposed an explanation for this phenomenon in terms of the onset- rime structure of the syllable. They argue that it is more difficult to access the final phoneme because it forms a phonological rime unit together with the preceding vowel. The initial phoneme, on the other hand, may be easier to access because it acts as a phonological unit on its own, that is, the onset.

de Graaff et al., (2007) working with kindergarten children also established that performance in identification of phonemes in word initial position was better than performance in identification of the phoneme in the final position of a word. It has been stated here that phonemes in the initial position are more often correctly identified than phonemes in the final position irrespective of the phoneme class to which the phoneme belonged. In this study, the phonemes in the initial sound identification task were: stops /k/, /b/, /g/ and /d/ and the fricative /f/ while the phonemes in the last sound identification sub-task were: stops /p/ and /t/, fricative /s/, nasal /n/ and the vowel /aʊə/.

From the present study, it is evident that the classification of a sound according to its place or manner of articulation did not reveal much as far as identification of the initial sound or final sound was concerned. The identification of plosives and fricatives in the initial position of a word or the identification of plosives or fricatives in the final position of the words did not reveal any significant difference in the performance of the respondents in these sub-tasks. This finding is supported by the results of Treiman et al., (1998) study who found that there were no difference between fricatives and plosives when they asked kindergarteners to perform phoneme recognition tasks in words.

However, mixed findings have been revealed in a series of studies in which the effects of plosives and fricatives were examined. Yavas & Gogate (1999) and Yavas & Core (2001) found out that performance on final consonants recognition was better for plosives than for fricatives. In other studies however, exactly the opposite result was obtained. For example, Bryne & Fielding – Barnsley (1990) found relatively poor performance by children in a phonemic identification tasks for plosives compared to fricatives in both initial and final position. Mc Bride – Chang (1995) also found that performance on position analysis was better for items containing fricatives than for items containing plosives.

It was also observed that the nasal sounds /m/ at the initial word position and the nasal sound /n/ at the word final position were incorrectly identified at 88% respectively. This finding is in contrast with Bryne & Fielding – Barnsley (1990) who reported better performance on both an initial and final phoneme identity task for nasals than for plosives. It is evident that the respondents had lesser difficulties in identifying the plosives than the nasals in the present study.

de Graaff et al., (2007) argue that task properties can influence performance in a phonological awareness task. The number of operations may require the respondent to perform only one mental operation for example, initial or final sound identification. This they called simple phonemic awareness task. Tasks that require more than one mental operation are referred to as compound phonemic awareness

tasks. Compound phonemic awareness tasks appear to be more difficult to children than simple phonemic awareness tasks. The test on missing sound identification contained two test items which required the respondents to analyse before identifying the missing sound from the second construct. This could be the reason why the respondents performed poorly in this sub-task. This is supported by de Graaff et al (2007) finding that task instructions affect children's performance in phonological awareness tasks. That is, the children performed better on CVC sound identification tasks when the instruction was free rather than when it was constrained.

4.2.3.3 The Blending Test

Phonological Blending is the process of combining sounds to come up with words. The respondents were expected to blend the sounds given to form correct English words (see Appendix V). The outcome is shown in Table 4.19. The responses from this sub-test were categorised as: Correct blending which is the percentage that contains correct blending. Those labelled 'substitution', 'phoneme insertion', 'phoneme deletion', and 'atypical' represent the nature of mis-articulation manifested in analysed data from the responses of sounds by the respondents in the blending sub-test. 'No response' caters for those who did not blend some of the sounds to form words.

Table 4.19: Different Responses from Phoneme Blending Test

Responses	Frequency	Percentage (%)
Correct Blending	139	69.5
Atypical	26	13
Substitution	18	9
Phoneme Insertion	12	6
Phoneme Deletion	1	0.5
No response	4	2
Total	200	100%

It is evident in Table 4.19 that the respondents performed well in the blending task. 69.5% blended the sounds correctly to come up with correct English words. The result on correct blending shows that even though the respondents were reading disabled, they were able to perform well in the blending test. According to the ranking of the difficulty of phonological awareness in Table 4.19, blending of phonemes is less difficult than a phonological awareness task that requires segmentation of phonemes that make up a word. 28.5% of the respondents made various blending mistakes and 2% gave no response.

A study that confirms that blending tasks could be easier than segmentation tasks is one that was conducted by Seymour and Evans (1994) who found out that blending was easier than segmentation for children who were required to blend and segment monosyllabic words.

The findings that knowledge in one phonemic awareness does not necessarily mean that a learner will also be knowledgeable in another is supported by the finding of some researchers. Jenkins et al., (1994) sought to clarify how one learning one kind of phonemic skill (e.g. auditory blending of individual sounds) affects children's ability to perform another kind of phonemic skill (e.g. segmenting spoken words into their phonemic constituents). (Jenkins, et al., 1994) report that the results on the phonemic generalization tests indicated that children taught segmenting-only, blending-only, or segmenting and blending performed substantially better on the particular skill (s) that they were taught than did an uninstructed control group.

From the findings by Jenkins, et al (1994), it may be pointed out that, if blending and segmenting share common components (e.g. an awareness that words are composed of phonemes) then it is expected that generalisation from one skill to another is observed. In the present study, it was noted that good performance by respondents in the blending task was not replicated in the phoneme segmentation task.

4.2.3.4 Phonological Production Test

Many respondents performed well in the phonological production test. In this test, the respondents were to give five English words that began with the sounds that

were presented to them by the researcher. Fewer problems with the production of words were realised with the consonant sounds. However, there were numerous substitution mistakes in the production of sounds that began with the vowel sounds. Table 4.20 below gives a summary of the mean scores of the respondents in the phonological production test dealing with the consonant sounds while Table 4.21 gives a summary of their mean score in production of words that began with the vowel sounds.

Table 4.20: Performance in Production of Words Beginning in Consonant Sounds

Scores	6	16	17	18	19	20	21	22	23	25	26	27	28	29	Total
Freq	1	3	1	2	1	2	1	3	1	3	1	2	1	3	25
X	6	48	17	36	19	40	21	66	23	75	26	54	28	87	545/25= 21.8

Table 4.21: Performance in Production of Words Beginning in Vowel Sounds

Scores	5	7	9	10	11	12	13	14	15	16	17	Total
Freq	1	1	1	1	5	1	4	6	2	2	1	25
X	5	7	9	10	55	12	52	84	30	32	17	313/ 25 = 12.52

It is evident in Table 4.20 and 4.21, above, that the respondents performed well in producing words that began with consonant sounds with a mean score of 21.8 against the mean score they obtained in production of words that started with the vowel sounds given in the Phonological Production test. Performance in production of words that began with consonant sounds was better with three students scoring 29 points out of the possible 30 marks. The respondent who scored highest in production of words that began with vowel sounds got 17 marks out of the possible 25. The distribution of marks in Table 4.20 and 4.21 reveal that the respondents generally performed better in tasks involving the consonant sounds compared to those involving the vowel sounds. This could be attributed to the fact that consonant sounds in English are easier to master than the vowel sounds of English which are more complex as a child has to be aware of the short vowels, the long vowels the diphthongs and the triphthongs.

4.2.3.5 Phoneme Segmentation Test

The respondents were expected to segment the words given in the phoneme segmentation test in order to come up with individual sounds that were used to make up the word. The phoneme segmentation test contained only five test items which each respondent was to keenly listen to as the researcher read each out and then identify the phonemes that made up the word (See Appendix IV). Their responses were captured as shown in the Table 4.22. ‘Correct segmentation’

contains the percentage of the responses where individual sounds were identified correctly. Those labelled, ‘phoneme insertion’, ‘phoneme deletion’, ‘spelling the word’, ‘pronouncing whole word’, ‘splitting the word’ and ‘atypical’ represent the nature of phonological problems exhibited while attempting to segment the target words by the respondents. ‘No response’ represents those who did not segment some of the words to get individual sounds.

Table 4.22: Responses from Phoneme Segmentation Test

Responses	Frequency	Percentage (%)
Correct Segmentation	10	8
Pronouncing whole word	35	28
Splitting the syllable	35	28
Atypical	22	17.6
Spelling the word	15	12
Phoneme Deletion	3	2.4
No response	5	4
TOTAL	125	100

From the Table 4.22 above, it can be observed that phoneme segmentation was a very difficult exercise for the respondents. Only 8% gave correct responses. 28% did not give the individual sounds that made up the words, they pronounced the entire word. 28% displayed some phonological awareness by trying to split the one syllable words into two. 12% of the respondents opted to spell the words instead on identifying the phonemes in them. Moreover, 17.6% of the respondents gave responses that exhibited that they did not comprehend at all what was required of them to perform in the task; these were referred to as atypical responses.

For example, giving the word “smell” instead of identifying the sounds in the word “nose”, producing the word “hot” instead of identifying the sounds in the word “hand”. The conclusion here was, respondents found the segmentation test to be the most difficult task. Their lack of phonological awareness in identifying phonemes that make up words was observed to be very high.

An attempt to explain these findings can be supported by the findings of Pufpaff (2009). Pufpaff (2009) reports the relative difficulty of syllable segmentation compared to phoneme segmentation among children in pre-school, kindergarten and first grade. Pufpaff (2009) report that syllable segmentation was easier than phoneme segmentation. None of the children in pre-school could segment by phoneme while nearly half, 46 percent, could segment by syllable. Among the kindergarteners, only 17 percent could segment by phoneme, whereas 48 percent could segment by syllable. Accurate performance increased dramatically in first grade, with 70 percent successfully segmenting by phoneme and 90 percent by syllable. This was one of the studies that empirically demonstrate that syllable level segmentation is easier than phoneme level segmentation and suggested that beginning reading instruction is likely to contribute to the development of phonemic awareness.

Owing to the fact that these are readers with reading disorders, it can be pointed out that despite the levels of instruction they have gone through, they are yet to

develop phoneme segmentation skills. Pufpaff (2009) study included kindergarteners and first graders. It is seen that with a certain level of instruction, children improve in their phonological awareness skills. The respondents in this study are in class six with their ages ranging between 12 years to 15 year olds. It is, therefore, assumed that they should not be exhibiting any problems in this task. It can be assumed that they lack the awareness that words can be segmented further into the smaller constituents that make them up called phonemes.

4.2.4 Summary of the Section

The present section discussed results to show the difficulty levels in the measures used in testing the phonological awareness skills of learners in class six with reading disabilities. The results show that phonological production was the least difficult. This was followed by non-word reading and phoneme blending tests. The most difficult sub-tests were phonological manipulation and phoneme segmentation with phoneme segmentation being at the extreme end in the level of difficulty. The next section deals with the evaluation of the significance of rapid automatic naming in reading.

4.3 Significance of Rapid Automatic Naming in Learners Reading

This section deals with the time the respondents took in answering the various phonological awareness tests that were given to them. The timing of the duration the respondents spent in answering the test addressed the third objective of this study which was: to determine the significance of rapid automatic naming in reading. The Table 4.23 below shows the mean time taken in answering each test by each respondent. The sub-tests did not have the same number of test items thus the use of the mean.

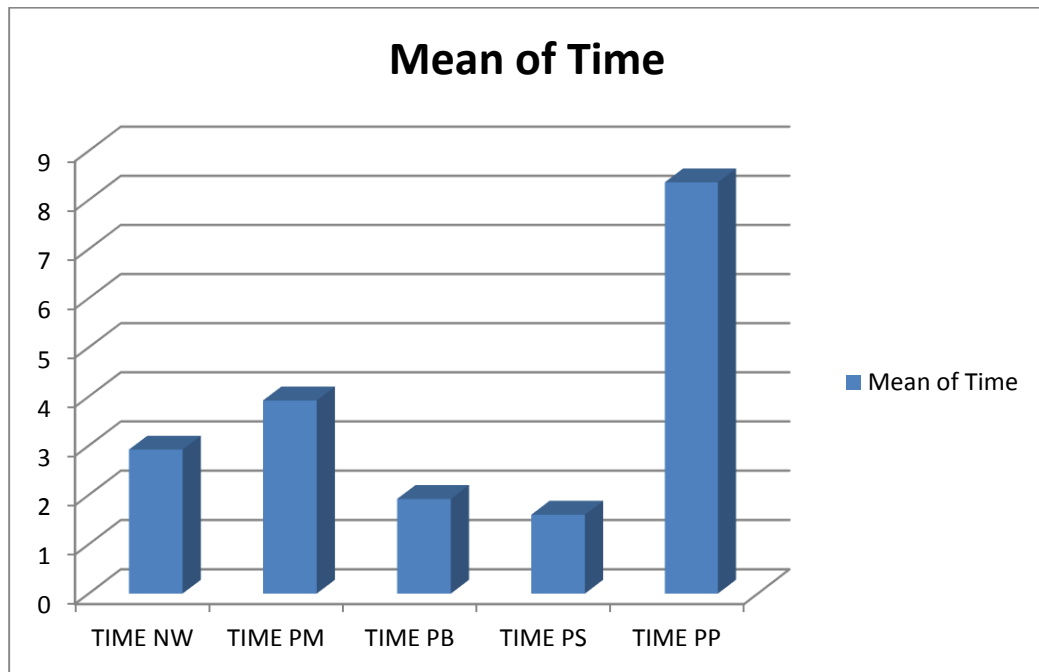
Table 4.23: Descriptive Statistics of Time Taken in each PA Tests in Minutes and Seconds

PA TASK	N	TIME IN MINUTES		
		MINIMUM	MAXIMUM	MEAN
PP	25	6	11	8.4
PM	25	2	8	3.9
NW	25	1	6	2.9
PB	25	1	3	1.9
PS	25	1	3	1.6

It is evident in Table 4.23 that respondents spent the least time in Phoneme Segmentation with a mean time limit of only 1minute and 6 seconds. The PS task was followed by Phoneme Blending with a mean of 1 minute and 9 seconds. The Non-word reading task had a mean of 2 minutes and 9 seconds, Phonological

Manipulation with a mean of 3 minutes and 9 seconds and finally Phonological Production with a mean of 8 minutes and 4 seconds. The trend that was observed after the analysis of data is presented in the Figure 4.1 below.

Figure 4.1: Descriptive Statistics of the Time Taken in each PA Test



As shown in Figure 4.1 above, the time taken in phoneme segmentation is the least. But as already discussed in chapter five, the test on Phoneme segmentation was the most difficult for the respondents. It was observed that one of the reasons why the respondents spent less time in PS was because they did not have any idea what to do. Their responses included reading the entire word, attempting to segment the words into their constituent syllables and identifying only a few

sounds from the target words. This finding leads to the observation in this study that performing a phonological task cannot singly be explained by rapid automatic naming speed alone; reading is influenced by other underlying components one of them being phonological awareness.

Another reason why there was variation in the time taken in each test could be attributed to the number of test items in each task. However, this may not be generalized to all the sub-tests. This is because the Non-word reading subtest and the Phonological Manipulation subtest contained an equal number of test items. The respondents performed better in the Non-word subtest compared to the Phonological Manipulation subtest. It is however clear from Figure 6.1 that the respondents took less time in Non-word reading compared to the time they took in Phonological Manipulation.

4.3.1 Naming Speed by Ages of the Respondents

In this section, the results of the time taken by each age group in answering the phonological awareness tests are given. Table 4.24 gives a summary of the time taken per age group in the Non-word reading, Phonological Manipulation, Phoneme Blending, Phoneme Segmentation and Phonological Production tasks.

Table 4.24: Naming Speed (in minutes and seconds) by Ages of Respondents

Task	Pupil's Age	N	Mean of Time
NW	Age 12	13	2.5
	Age 13	8	3
	Age 14	3	2.3
	Age 15	1	5
PM	Age 12	13	3.8
	Age 13	8	4.3
	Age 14	3	3.3
	Age 15	1	4
PB	Age 12	13	3.7
	Age 13	8	2
	Age 14	3	2
	Age 15	1	2
PS	Age 12	13	1.5
	Age 13	8	1.8
	Age 14	3	2.5
	Age 15	1	1
PP	Age 12	13	8.2
	Age 13	8	8.5
	Age 14	3	9
	Age 15	1	8

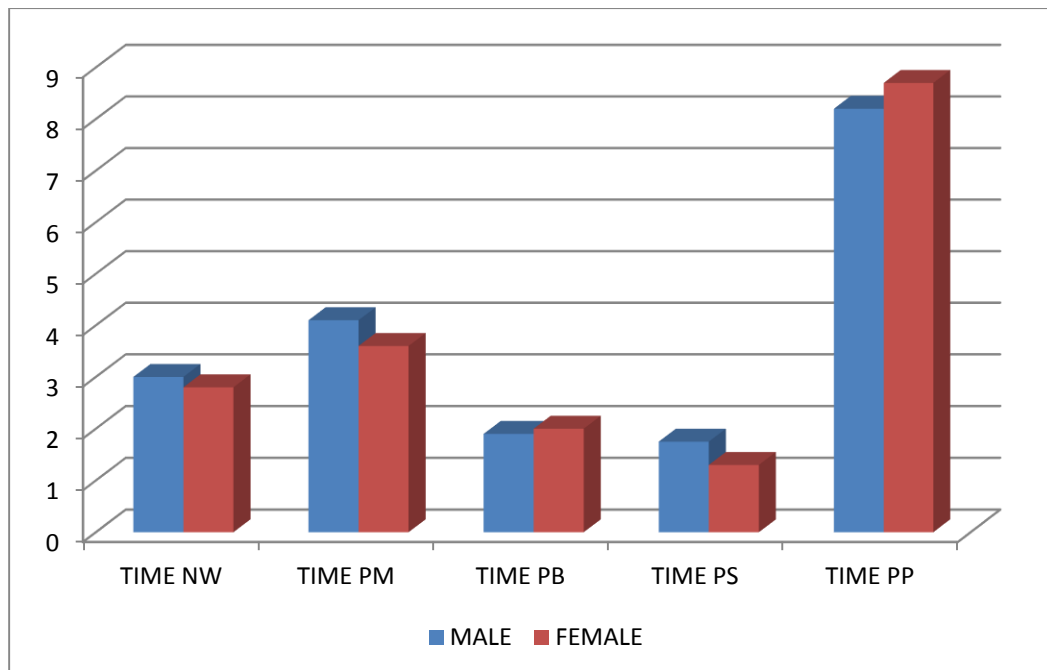
Table 4.24 shows the time the respondents took in completing the various phonological awareness tests. It can be observed that the time the 12 year olds, the 13 year olds and the 14 year olds took in performance of each PA test did not differ significantly across all the tests. It can also be observed that there is no significant relationship between performance in one task and the time the

respondents take in it. This is evident in the performance of the 15 year old respondent who took less time in Phonological Production and Phonological Segmentation tests but performed poorly in the two tasks compared to the respondents in age groups 12, 13, and 14. The mean time for the 15 year old was highest in the Non-wording reading test and he also performed poorly in this task.

4.3.2 Naming Speed (in minutes and seconds) by Gender of the Respondents

This section gives the results of the time spent in responding to the tasks on Non-word reading, Phoneme Manipulation, Phoneme Blending, Phoneme Segmentation and Phonological Production.

Figure 4.2: Summary of Naming Speed (in minutes) by Gender



It is evident in Figure 4.2 that the female respondents took a relatively shorter time to respond in Non-word Reading, Phonological Manipulation and Phoneme Segmentation tasks than their male counterparts. However, the male respondents took a relatively shorter time in Phonological Production. The mean of time taken in Phoneme Blending between the genders of the respondents was very close and therefore, it was observed that the respondents took nearly equal time in responding to the test. This finding revealed that the naming speeds of both the female and male respondents were not significantly different in performance of the phonological awareness tasks.

4.3.3 Discussion of Naming Speed in Reading

The five sub-tests used in the present study were timed to show that rapid automatic naming is significant in reading. Children who have reading disabilities have been found to take longer in reading tasks (Zettler, 2007). The results are discussed within the framework of rapid automatic theory.

The Rapid automatic naming theory indicates that children who are able to read very fast and fluently have good naming speed abilities. There is also a proposition that naming speed and phonological awareness both play a critical role in the reading abilities of the children (Zettler, 2007). The ability to rapidly name letters, in particular, is of utmost importance for reading. This is because letters and their

corresponding sounds must be recalled rapidly and accurately for fluent reading to take place. Readers with difficulty in rapid naming tasks may have sufficient phonological processing skills necessary for decoding words, but they will not be fluent readers if their rapid letter recall ability is taxed (Wolf & Bowers, 2002). Consequently, reading and reading comprehension can suffer as a result of naming speed impairment. According to the double-deficit hypothesis (Wolf & Bowers, 2002), individuals with RD can have selective deficits in phonological processing, rapid naming, or both, and it is those readers with both impairments who tend to be the most severely affected in their reading ability (Wolf & Bowers, 2002).

In the present study, the respondents with reading disability in class six were tested on various phonological awareness tasks. These activities were timed. Time spent in each activity by each learner was recorded. It was found out that majority of the students who performed extremely poorly in the tests were of the ages 15, 14 and 13 year olds. It was also noted that learners who scored high marks also spent less time in each task. This qualifies what is stated in Rapid Automatic Naming Theory that many learners who can read better and fluently spend less time in the tasks. Those who have severe problems in reading spend more time in trying to read. However, pupil number 13 did not spend much time in the reading tasks. He scored the least marks compared to the rest getting 10 marks out of 73 and spending 17 minutes for the entire testing. The learner number 10 scored the highest marks of 61 out of 73 in a time of 12 minutes. Learner number 1 and

number 4 both spent more time (27 minutes) with each scoring 34 and 28 respectively. The scores of individual learners and the time each spent varied across all their ages. The present study also confirms that learners with minor reading disorders spend little time in reading and those with severe reading disorders spend more time.

These views are supported by Wolf et al., (2002) who provides empirical support for the existence of a naming speed deficit in 144 second- and third-grade children with reading impairment using both IQ-discrepant and non-discrepant classifications of RD. In their study, children performed a variety of measures tapping phonological and rapid naming components of the reading skill, including word identification, word attack, and passage comprehension subtests of the Woodcock Reading Mastery Test-Revised (Woodcock, 1987) and the letters subtest of the Rapid Automatized Naming Test (Denckla & Rudel, 1976), in addition to several other measures, including the Kaufman Brief Intelligence Test (KBIT), Kaufman & Kaufman, 1990). Multiple regression analyses indicated that both the phonological and naming speed measures accounted for unique variance in the reading measures given, signifying their independence as individual predictors of reading performance.

Thus, questions remain as to the precise nature of the relationship of naming speed to reading. It is possible that a broad timing deficit or a general cognitive or

perceptual deficit may help to explain the relationship of naming speed to reading, or that a deficit in naming speed simply exacerbates any phonological deficit present. As Waber et al., (2000) suggest, although the naming speed task appears to be a simple one, there are likely multiple processes at work when one is engaged in the RAN task, including executive function, processing speed, attention, and visual perceptual processing. Each of these processes may influence not only reading ability, but learning ability in general.

The analysis of the transcribed data in the present study indicates that the respondents who scored low marks in the sub-tests of phonological awareness also spend longer time in responding to the tasks. The results in the present chapter also indicate that there were no significant differences in the time taken by respondents in answering the PA tests across the ages of the respondents. The 15 year olds took less time than the 12, 13 and 14 year olds but his performance was poor in all the tests compared to those in other age brackets. Moreover, the results of the study show that there was no significant naming speed difference between the male respondents and the female respondents in the PA tests. The time taken by the females was slightly higher than that of the males in PB and PP while the time taken by the males was slightly higher than the females in NW, PM and PS.

4.4 Summary of the Chapter

The present chapter presented data to discuss the natures of phonological awareness skills of class six learners with reading disability. It also presented data to demonstrate the levels of difficulty of the measures of phonological awareness. It ends with a section that evaluated the significance of naming speed in reading as presented in the responses of the respondents.

The next chapter gives the summary, conclusion and recommendations of the present study.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

The present study contributes theoretically and empirically to the area of phonological awareness and its importance in reading. Theoretically, it provides additional evidence that phonological is a key factor in reading and that children with deficits in it are likely to experience reading disabilities. Practically, it gives the nature of the respondents' phonological awareness deficits.

5.1 Summary of Findings

The main findings of the three objectives of the present study are presented in this section. The first objective that guided this study was to determine the nature of phonological awareness skills of class six learners with reading disabilities in selected schools in Nairobi County. The following are the findings from the first objective of the study.

While describing the nature of the respondents' phonological awareness skills, it was observed that a few respondents had phonological awareness skills in all the five tests. This was presented in percentages of correct responses across the five

tests. It was also observed that substitution mis-articulations were the most common in most of the tests. Some of the substitution mis-articulations were due to reversals of the target sounds. For example, articulation of /b/ instead of /d/ and conversion where /b/ was identified as /p/. Other substitution mis-articulations observed were those that were as a result of the change of place of articulation, manner of articulation or voicing of the target sound. There were nearly equal mis-articulations involving the consonant sounds and the vowel sounds. Most substitution mis-articulations involving the vowel sounds were due to the quality of the target sound. There were instances where there was interchange of the short vowels with other short vowels not in the target word, words with long vowels instead of short vowels and diphthongs for short vowels.

Phonological measures that required phoneme segmentation proved to be the most difficult for the respondents. It was observed that the respondents could identify the letters used in the words instead of the sounds that corresponded with the letters. It was also observed that the respondents were not conscious of the onset and the rhyme structures of the syllables found in English. Most of the words from which they were to identify the phonemes were monosyllabic. Instead of identifying the onset, the respondents combined the consonant in the onset with the vowel sound that immediately came after it. For example, articulation of the word “go” as /gɔ/ when the response required was for the respondent to identify the

initial sound /g/ in the word “go”. The vowel sound /ɔ/ belongs to the rhyme part of the syllable; in fact, it is the nucleus of the syllable.

The study also found out that the mis-articulations of phoneme deletion; phoneme insertion; reading of the entire word instead of identifying the sounds; spelling the words even though were some of the manifestations of deficits in phonological awareness were not as pronounced as substitution mis-articulations and atypical mis-articulations. Atypical mis-articulations were observed to be serious manifestations of lack of phonological awareness compared to the other mis-articulations. Atypical mis-articulations show that the learners’ responses are not near the target in terms of composition of the sounds given as responses against the target words. These mis-articulations were common in all the tests.

The second objective of the present study was to establish the difficulty levels of measures used in testing phonological awareness. The main findings are presented as follows. First, the study ranked the difficulty levels of the measures used to test phonological awareness. It was observed that phonological production test was the easiest. This test required the respondents to come up with various words that began in the sounds that were given as the test items. This was followed by non-word reading in which the respondents were to use their phonological skills to read words that were not English words. The phoneme blending test was third. Here the

respondents were to put together the sounds given out orally by the researcher into words. Phonological manipulation which tested the respondents' skills of identifying the initial sound in a word, the missing sound in a word and the last sound in a word was the fourth most difficult task for the respondents. The most difficult test for the respondents was the phoneme segmentation test. In this test, the respondents were expected to identify the individual sounds that made up the words. This conclusion was arrived at because the responses of the respondents exhibited clear lack of phonological awareness of segmenting a word into its constituent phonemes. These results of these sub-tests guided the present study in categorisation of mis-articulations.

The third objective of the present study was to evaluate the significance of naming speed (RAN) in reading. This was done by taking down the time individual respondent spent in each test. From the analysis of the mean time each respondent took, it was observed that there were no significant differences in the time taken across the age groups. As far as the gender and time taken in each test is concerned, it was also noted that there is no significant difference in the time taken by females and males. It was also observed that spending more time or little time in a task did not mean good or worst performance in the task. Generally, it was observed that respondents who scored high marks also spent relatively little time in the tests. Literature indicates that naming speed influences the reading rate,

accuracy and fluency in reading. The present study did not establish this thus the suggestion that this phenomenon be studied further.

5.2 Conclusions

The results of the present study allow certain conclusions to be made in relation to the assumptions of the study. The first assumption of the study was that there are manifestations of phonological awareness deficits by learners in class six with reading disabilities of the study. The discussion in chapter four confirmed this from the analysis of the various categories of the mis-articulations that were made by the respondents in answering the phonological awareness tasks. The mis-articulations were dominated by substitutions and atypical categories. The study can therefore conclude by accepting this assumption. The conclusion is that class six learners with reading disabilities also have deficits in their phonological awareness skills.

The second assumption was that there are levels of difficulties among the various measures used to test phonological awareness. The results in chapter five giving the rank of the least difficult sub-test to the most difficult sub-test is evidence that measures of testing phonological awareness have different levels of difficulty. It can be concluded that the level of difficulty of phonological awareness tasks should be taken into account and be used to establish the exact deficits in phonological awareness that can be extracted from such tests.

The third assumption was that there are contributions of rapid automatic naming in reading. The results in chapter six give inconclusive evidence as to the exact contribution of rapid automatic naming in performing decoding of words and identification of sounds. It was observed that there were students whose reading speed was high and their performance in the phonological awareness tasks was also good. Conversely, there were other students who took a relatively shorter period in the tasks and performed dismally in the tasks. Moreover, there were those who took more time and performed poorly and those who took more time and performed well. Generally, the respondents who scored high marks in the sub-tests also spent less time in the tasks. The conclusion is that there is some link between naming speed and decoding of words.

5.3 Implications of the Study

This section explores the theoretical and pedagogical implications of the most significant finding of the present study.

5.3.1 Pedagogical Implications

The study has provided data on the mis-articulations that characterise the phonological awareness skills of class six learners with reading disabilities. This means that class six pupils with reading disabilities could be experiencing the reading disabilities due to lack of adequate phonological awareness. Teachers of

class six pupils should be aware of this deficiency so as to employ phonological awareness training and interventions programmes that will help to ameliorate the pupils' reading disabilities.

Curriculum developers will find this study helpful in designing appropriate instructional strategies that will involve teaching of reading using all the measures of phonological awareness. For example, phoneme blending, phoneme manipulation, phoneme segmentation, non-word reading just to mention a few.

Language therapists who visit schools or run intervention and training programmes for children with reading disabilities will also find the present study useful in adopting phonological training tasks and intervention programmes that are age appropriate for the children who are in need of their help.

5.3.2 Theoretical Implications

The present study demonstrates that children with reading disabilities could also be having deficits in phonological awareness. This is evident in the various misarticulations that have been discussed. This confirms the conceptualisation of phonological awareness as a contributing factor in effective reading development. Vaughn, et al., 2004) state that phonological awareness has a bidirectional link with reading and that a child who experiences difficulty in reading often face

challenges in phonemic awareness activities and a child who demonstrates deficits in phonemic awareness skills is frequently identified as having reading disabilities.

The present study also provides evidence that different tasks for testing phonological awareness have varying difficulty levels. Respondents had least difficulties in phonological production, non-word reading and blending tasks. All these three tasks required some blending of some kind. Phoneme manipulation proved to be difficult but the extreme of difficulties was phonemic segmentation. These findings are in agreement with the phonological awareness theory by Antony (2003) which shows that children can detect similar or dissimilar sounding words before they can manipulate sounds within words and that children can generally blend phonological information before they can segment phonological information.

The present study also found out that respondents who performed better in PA tasks also spent less time in the tasks and those who scored poorly tended to spend more time. However, a clear link between naming speed and reading was not established.

5.4 Recommendations

The recommendations of the present study are as follows:

- i). Firstly, there are phonological awareness deficits exhibited by learners in class six with reading disabilities which require remedy for the children to improve on their reading abilities.

- ii). Previous researches and the findings of the present study have shown that there are difficulty levels of the various measures of phonological awareness. There is need for an effective training approach that includes instructions and reading activities containing phoneme blending, phoneme manipulation, phonological production, phoneme segmentation, non-word reading and any other phonological awareness task which will enable the children to apply their phonological awareness skills in decoding words.

- iii). There is also need to include activities that improve the children's naming speed. This will enable learners to develop quicker word decoding skills so that they can concentrate in comprehending the texts instead of labouring to decode individual words. This is because by class six, children should be reading to learn not learning to read.

5.5 Areas for Further Research

It was not possible to undertake a nationwide investigation involving samples of class six learners in all the counties in the country. This study was only conducted in a few selected schools in Nairobi County. It is therefore suggested that a further study that would investigate the phenomenon at all the Counties in Kenya would be appropriate.

The present study focused particularly on the respondents who through a diagnostic test exhibited characteristics which showed that they had reading disabilities. A comparative study needs to be done to establish the nature of phonological awareness skills of children who have no reading disabilities against those who are reading disabled.

The current study also focused more on the learners' phonological awareness skills. These learners are taught by teachers. The teachers transfer their knowledge to the learners. It is therefore suggested that a study should be conducted to establish the phonological awareness skills of the teachers more so those in the kindergarten classes and the lower-classes in primary schools. This is because these are the levels that are crucial in the acquisition of phonological awareness which plays a big role in reading acquisition.

The present study did not find clear contribution of rapid automatic naming in reading. Serious longitudinal researches need to be done across all levels of primary education to establish its contributions towards skilled reading.

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APPENDICES

Appendix I: Non-word Test

Name of pupil..... No:.....Age.....

Name of school.....

Date of Recording.....Time of recording..... Time taken.....

I want you to read some non-words. These are not real words, they don't make any sense. Try to sound out the sounds and see what they say when you put the sounds together. This test will take about 3 minutes.

Word	Yes	No	Word	Yes	No	Word	yes	No
-ked			-plin			Whag		
-yok			- snel			- shob		
-hik			- skad			-thed		
- ruk			- blon			-phim		
-trud			-chub			- simfron		

Appendix II: Phonological Production Test

Name of pupil..... No:.....Age.....

Name of school.....

Date of Recording..... Time of recording..... Time taken.....

Give five words that begin with each of the sounds below. This test will take about 9 minutes.

i) /b/ ii) /m/ iii) /d/

iv) /s/ v) /g/ vi) /k/

vii) /æ/ viii) /ɔ/ ix) /ʊ/

x) /e/ xi) /ɪ/

Appendix III: Phonological Manipulation Test

Name of pupil..... No:.....Age

Name of school.....

Date of Recording.....Time of recording..... Time taken.....

In this test you will listen to one word at a time. You will tell me what its first sound is. Here are two examples:

eg. chair - its first sound is - /tʃ/

eg. no -> /n/

This test will take about 4 minutes.

Now listen to the following words and tell me the first sound for each.

1. **boy** ->
2. **computer** ->
3. **desk** ->
4. **five** ->
5. **go** ->

In this part you will hear two words at a time. The second word is the same as the first word, except that the first sound is missing. You will tell me what sound is missing. Here are two examples:

eg. chair - /tʃeə/, /eə/ -> /tʃ/

eg. no - /nəʊ/, /əʊ/ -> n

Now listen to each pair of words and tell me what sound is missing from the second word:

1. **jump, ump** ->
2. **monday, unday** ->

3. **teacher, each** ->

4. **play, lay** ->

5. **stop, top** ->

In this part you will hear one word at a time. You will tell me what sound is missing at the end of the word.

eg. chair -> /eə/

eg. no -> /əʊ/

Now listen to each word and tell me the sound missing in at the end:

1. **chicken** -> chicke

2. **sheep** -> shee

3. **pet** -> pe

4. **foot** -> foo

5. **mouse** -> mou

Appendix IV: Phonological Segmentation Test

Name of pupil..... No:.....Age.....

Name of school.....

Date of Recording.....Time of recording..... Time taken.....

In this test you will listen to one word at a time. You will tell me what sounds make up the word. Try to break it down into the smallest sound unit you can. This test will take about 2 minutes.

chair -> /tʃ/, /eə/

The word '*chair*' has two different sounds. Now listen to the following words and tell me the sounds that make them up.

1. **nose** ->
2. **hand** ->
3. **friend** ->
4. **foot** ->
5. **knee** ->

Appendix V: Phoneme Blending Test

Name of pupil..... No:.....Age.....

Name of school.....

Date of Recording.....Time of recording.....Time taken.....

In this test you will hear sounds and then combine the sounds to form words. This test will take about 2 minutes. The purpose of the test is to find out how well you can combine sounds to form words.

1. c/u/t -
2. c/a/n ->
3. p/i/g ->
4. t/ea/ch ->
5. k/ee/p ->
6. b/l/o/n/d
7. b/a/ll
8. r/ea/d

The tests are adopted from the work done by Levis, J.M. (2007). However, they are modified to suit this study.

Appendix VI: Time Taken in Minutes to Accomplish each Reading Test by Respondents

Respondent's No.	Non-word	Phonological production	Phonological manipulation	Phoneme segmentation	Phoneme blending
1	6	10	7	3	2
2	3	8	8	2	2
3	1	8	4	2	2
4	6	10	8	3	3
5	3	10	4	2	2
6	3	7	4	2	1
7	3	11	3	1	2
8	5	9	6	1	2
9	2	8	3	2	2
10	2	8	3	1	1
11	2	7	2	1	3
12	2	8	4	3	2
13	5	8	4	1	2
14	2	9	2	2	1
15	6	9	4	2	3
16	2	7	4	1	2
17	2	9	3	2	1
18	2	7	3	1	2
19	2	9	3	1	2
20	4	9	3	1	2
21	2	6	3	2	1
22	2	8	3	1	2
23	2	9	3	1	2
24	2	8	3	1	2
25	2	7	4	1	2
MEAN	2.92	8.36	3.92	1.6	1.92

Appendix VII: Summary of the Scores of the Respondents in PA Tests

RESPONDENT NO.	NON-WORD	PM	PS	PB	PP
1	0	1	0	7	35
2	4	5	0	4	38
3	11	1	0	7	34
4	0	5	0	4	29
5	12	1	0	7	33
6	10	8	0	7	37
7	5	2	2.5	5	29
8	0	0	0	4	21
9	8	3	0	3	31
10	14	10	0	7	47
11	11	12	1	8	36
12	11	0	0	7	35
13	0	0	0	2	16
14	2	7	0	4	30
15	1	2	2	7	35
16	10	4	2.5	4	39
17	6	5	1.5	6	39
18	10	11	2.5	6	36
19	14	4	0	8	37
20	4	5	2.5	8	40
21	12	9	2.5	5	42
22	7	7	2	5	32
23	6	4	1.5	6	38
24	7	5	2	2	37
25	10	4	0	5	29
Mean	7	4.6	0.9	5.52	32.6

Appendix VIII: Time Taken in Answering PA Tests

A) Time Spent in Non-word Reading

Minutes	Frequency	Percentage
1	1	4
2	14	56
3	4	16
4	1	4
5	2	8
6	3	12
Total	25	100

B) Time Spent in Phonological Production

Minutes	Frequency	Percentage
6	1	4
7	5	20
8	8	32
9	7	28
10	3	12
11	1	4
Total	25	100

C) Time Spent in Phonological Manipulation

Minutes	Frequency	Percentage
2	2	8
3	11	44
4	8	32
6	1	4
7	1	4
8	2	8
Total	25	100

D) Time Spent in Phoneme Segmentation

Minutes	Frequency	Percentage
1	13	52
2	9	36
3	3	12
Total	25	100

E) Time Spent in Phoneme Blending

Minutes	Frequency	Percentage
1	5	20
2	17	68
3	3	12
Total	25	100

Appendix IX: Reading Skills Pre-test

Name of pupil..... No:.....

Name of school.....

Date of Recording..... Time of recording..... Time taken.....

Read and pronounce correctly each letter or word starting with /a/. Then progress from left to right.

When the pupil misses 5 words in a row or is frustrated, stop. Next add the number of words read to help you keep a tally of the number of words the pupil as read in each row.

Sounds/Words	Yes	No	Words	Yes	No	Words	Yes	No
a/ b o p e r t m (8)			To See Cat Milk Red Tree Big Book (16)			Was City Eat Him Animal Letter Then Himself (24)		
How Deep Spell Between Weather Lip Block Awake (32)			Size Board Felt Chin Tray Approve Cliff Staff (40)			Split Huge Plot Quality Escape Urge Collapse Grieve (48)		
Abuse Residence Estimate Consider Glutton Exhaust Imply Image (56)			Responsibility Theory Threshold Participate Ethics Decorate Eliminate Triumphs (64)			Tomato Humidity Content Blessed Humiliate Lighten Intrigue Predictable (72)		

Appendix X: Consent to Participate in Research

Researcher: Orago, O. Stephen
Kenyatta University
Department of English and Linguistics
Phone: 0723508136

Title of Thesis: An investigation of phonological awareness skills of learners in class six with reading disabilities.

I have been given and have understood an explanation of the research project and have been given an opportunity to ask questions and receive answers about it.

I understand that I may withdraw my child from the research without giving a reason.

I understand, and agree that some of the sessions with my child will be audio-taped.

I agree that who is under my guardianship may participate in this research.

Signed:

Name:

Date:

Child's birth date:.....

Does your child have challenges in hearing or with his/ her sight?

Appendix XI: Reliability and Validity of the Test

Row scores of the pilot test by ten students in Kahawa Garrison Primary School.

Respondent	Even scores	Odd scores	TOTAL
1	10	11	22
2	17	17	34
3	15	17	32
4	17	14	31
5	15	18	33
6	17	16	33
7	13	15	28
8	15	13	28
9	12	12	24
10	14	14	27

Cronbach's coefficient alpha computed in SPSS to get the reliability coefficient for the present study

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.719	.746	2

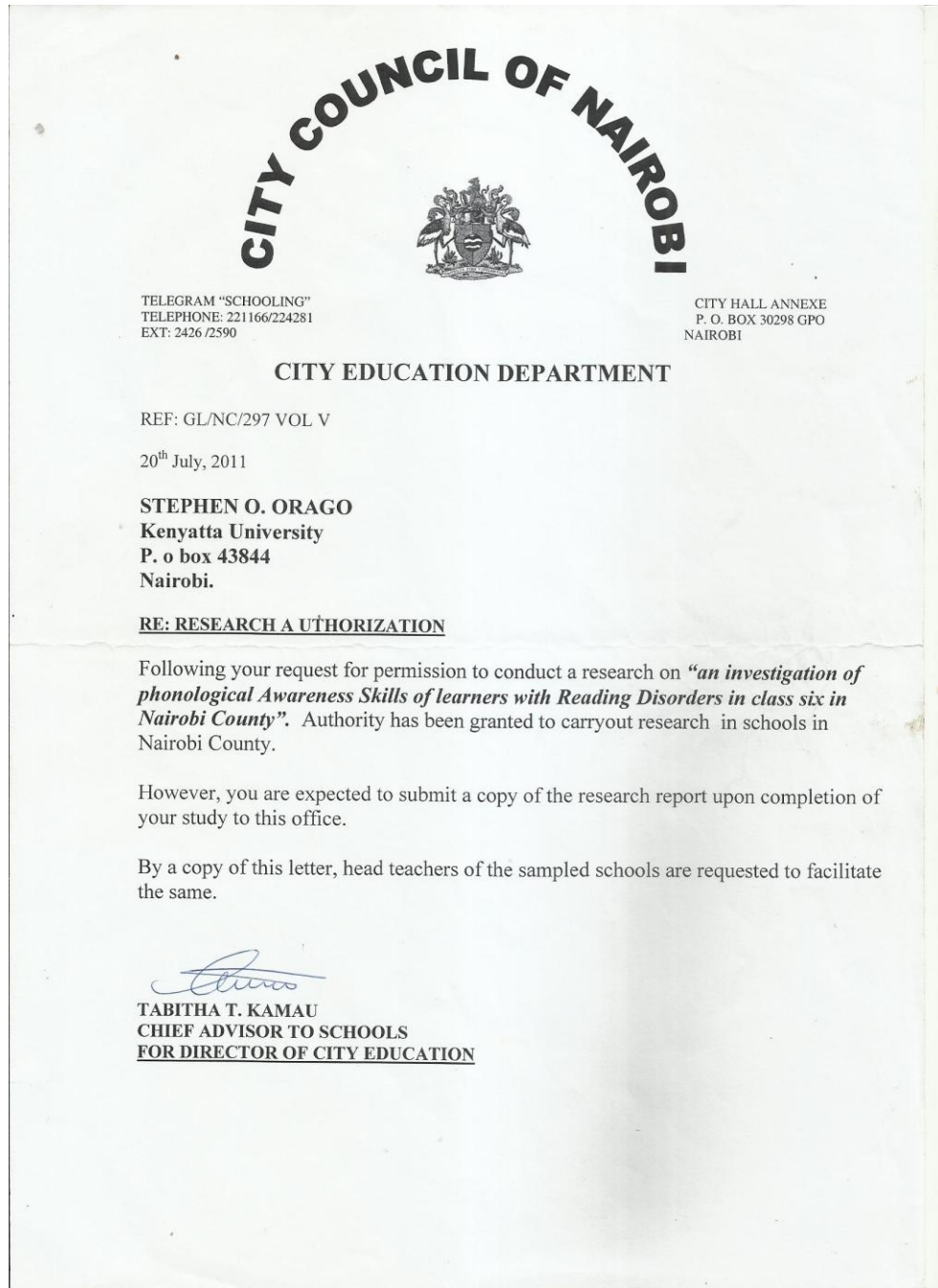
Factor Analysis computed using SPSS to find the validity index for the present study

	Component
	1
Even scores	.893
Odd scores	.893

Extraction Method: Principal Component Analysis.


a. 1 components extracted.

Appendix XII: Research Permit from County Council of Nairobi



Appendix XIII: Research Permit from the Ministry of Education, Science and Technology

REPUBLIC OF KENYA



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telegrams: "SCIENCETECH", Nairobi
 Telephone: 254-020-241349, 2213102
 254-020-310571, 2213123.
 Fax: 254-020-2213215, 318245, 318249
 When replying please quote

P.O. Box 30623-00100
 NAIROBI-KENYA
 Website: www.ncst.go.ke

Our Ref: **NCST/RRI/12/1/SS-011/888/4** Date: **7th July, 2011**


Stephen Ochieng Orago
 Kenyatta University
 P. O. Box 43844
 NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on **"An investigation of phonological awareness skills of learners with reading disorders in class six in Nairobi County"** I am pleased to inform you that you have been authorized to undertake research in **Nairobi District** for a period ending **31st December, 2011**.

You are advised to report to **the Permanent Secretary, Ministry of Higher Education, Science & Technology & the Provincial Commissioner, Nairobi Province** before embarking on the research project.

On completion of the research, you are expected to submit **one hard copy and one soft copy** of the research report/thesis to our office.



DR. M. K. RUGUTT, Ph.D, H&C
DEPUTY COUNCIL SECRETARY

Copy to:
 The Permanent Secretary
 Ministry of Higher Education, Science & Technology
 Jogoo House "B" Harambee Avenue
NAIROBI

The Provincial Commissioner
 Nairobi Province