A desktop application to improve the phonological awareness of Arabic vowels for visual impaired Egyptian children

د/سارة مصطفى محمد الحناوي

مدرس بقسم الصوتيات و اللسانيات. كلية الآداب جامعة الإسكندرية

Abstract

Children who can play with and recognize the sounds that make up words, even without understanding what the words mean, are more likely to become good readers. This skill, called phonological awareness, gets stronger over time and plays a big role in how well kids learn to read.

This skill involves awareness of phonology and the ability to play with those sounds. It starts with noticing single sounds, then putting them together, and finally taking sounds away. Different tasks measure this developing ability in young children who are learning to read. The key is understanding the language's sound structure and being able to hear and manipulate those sounds in your head.

 Literacy, it is critical for blind populations to achieve social equality and unleash their strengths and abilities. As a result, this is their basic right to an educational process, which is guaranteed to them by education law in almost every modern country. Education that does not address the specific needs of those children may have serious consequences for the balance of their perceptual and cognitive abilities. Therefore, they need special attention in language diagnosis and rehabilitation approach to language skills and abilities.

Desktop applications allow students to learn even offline, unlike web apps. Technology also helps keep blind students engaged, which can boost

information retention. By enabling collaboration among blind students, these applications can further promote peer-to-peer learning. Overall, these factors can significantly improve blind students' phonological awareness and discrimination skills.

Keywords

Phonological awareness, phonological discrimination, desktop application for blind children

Objectives

- To create a desktop application for Egyptian blind children as a tool to improve their phonological discrimination between short and long Arabic vowels (the short vowels /u, ɪ, a/ and the long vowels /u:, i:, a:/) in familiar Arabic words
- Using this desktop application help the Egyptian blind children and their families to improve forming Arabic words with short and long vowels and thus improving their spelling.

The desktop application revealed the positive impact in improving phonological discrimination for blind children and the electronic tests and exercises that were used give a great benefit to the Egyptian blind children spell and form new words.

This study considers as the first study concerning with the discrimination and awareness of Arabic vowels in different words for blind children

Visual impaired children may be hindered by their lack of visual representation, but this does not prevent them from keeping pace with their sighted peers. Academically, if they receive adequate speech training that develops their auditory and tactile abilities, this can compensate them for vision loss and improve their other senses.

Visual impaired children as other disorders need speech and language sessions as it was noticed that they have phonological and morphological errors that delay their progress in schools and faculties.

Introduction

Characteristics of blind or visual impaired children

The impact of blindness or low vision on a child depends on when they lose their sight and how severe it is. Children born blind might need extra help to develop normally. This is because sight motivates young kids to move around and explore (like reaching for a new toy) and connect with others. So, it's important for adults to help visually impaired children engage with their surroundings and play with other kids.

Visually impaired children might struggle to connect words to ideas and understand different meanings because they can't rely on sight. For instance, a child who hasn't seen a bird might have trouble describing its parts (like feathers) or how birds behave. This is why hands-on activities (like feeling a feather) are helpful for learning new concepts and meanings of words.

Some blind or visually impaired students might struggle with proprioception or their awareness of their body in space which is directly related to motor development. This is an important skill for students because proprioception is needed for mobility (i.e., moving about an environment safely and efficiently) and orientation (i.e., the process of using sensory input to know one's position in their environment). Children with visual impairments can thrive in learning skills to get around safely on their own if they start practicing early. Additionally, tools like GPS can be helpful for people with blindness or low vision to move around their surroundings more confidently (Smiley et al. ٢٠٢٢).

Educators working with visually impaired students (blind or low vision) should create learning environments that maximize the use of their remaining sight and other senses. It's important to note that teaching students with visual impairments requires specialized training and a specific license for special educators.

Impact of visual impairment and blindness in learning skills

Learning skills are a complicated process of functions. For example, learning to reading consists of two stages – decoding and comprehension-which are interrelated skills. Children who have (severe) visual impairments or blindness commonly use the Braille code for reading, which is based on the tactile use. Children who are blind, deploy abilities as the use of phonemes and word recognition. Moreover, children with loss of vision are more skilled in speech discrimination and language processing. However, visual information is more effective and rapid in relation to tactile. Reading comprehension has become the focus of interest in recent years. Reading comprehension and verbal working memory (phonological loop that allows the provisional storage of verbal and acoustic information) are related. Working Memory (WM) has significant relationships with many aspects of language development, such as vocabulary acquisition and reading. Studies have shown that children with visual problems in Diagnostic codification don't show problems in verbal comprehension. Argryropoulos (٢٠١٧).

Phonological awareness

Understanding the sounds in spoken words (phonological awareness) is like building the foundation for reading. It helps with decoding, blending, and finally, being able to read words by yourself. In the early years, children

learn to recognize parts of words like syllables and sound chunks (like "at" in "cat"). As they get older, they develop the ability to play with individual sounds in words, like putting sounds together or taking them apart. These skills, called phonological awareness, are essential for young children to learn and keep building on throughout their early school years. Strong phonological awareness is one of the most important things that helps children become good readers and spellers, and it's important for learning to read any language (Lafranceet al. ٢٠٠٥).

Children develop listening and speaking skills called phonological awareness. This helps them recognize that speech is made up of separate words. They also learn that words can be broken down into different sounds and sound patterns. Phonological awareness involves various abilities to play with and identify these sounds, from large chunks like words down to tiny pieces like individual sounds. Kids who can play with sounds in spoken language, like figuring out rhymes or how many sounds are in a word, tend to learn to read and write much easier. This skill, called phonological awareness, is like the building blocks for learning to read. Some children grasp it naturally, but others need extra support to understand how sounds work within words (Menchetti et al. ٢٠٠٨).

Phonological discrimination

It is the ability to recognize and differentiate between different sounds in a word. It also aids in the explanation of how sound functions in various ways within a word.

Phonological discrimination which is a component of phonological awareness interacts with and facilitates the development of vocabulary

and word consciousness. The fact that words are made up of smaller sounds like syllables and phonemes aids children in "breaking the code" of written language and learning the alphabetic principle. The alphabetic principle states that written words have a sound-by-sound correlation with spoken words. A single letter, or, in certain situations, many characters, represent a single sound in a word (for example, "sh" and "ch"). When teachers and parents tell a child, who is trying to write or read to "sound it out," this suggestion will only make sense if the child grasps the concept that the word can be broken down into these smaller components. Young children learning to read and write sound out words using their knowledge of sounds or figure out what letters go with sounds they hear using their knowledge of letters (Goswami, ٢٠١٤).

Simple activities including talking and engaging in conversation, singing songs, playing word games, learning nursery rhymes and poems all contribute to the development of phonological awareness and discrimination (Daffern, ٢٠١٨).

Phonological awareness in visual impaired children

Blind children are among the special groups most in need of attention and assistance because the blind child is born with all the elements of the normal child, but the loss of vision imposes restrictions on him, which negatively affects his psychological and academic condition. In this regard, the follower of the field of visual impairment notes that there is a clear lack of support services for the blind, a scarcity of training programs aimed at training these children and there is evidence that the blind does not compensate for visual abilities. On the contrary, they may suffer from impaired perception of the degrees, consistency, rate and duration of the sound, which constitutes a

limitation for him to distinguish between the sounds of letters, syllables and words, and this may result in difficulty in learning to read and write.Salem (٢٠١٦)

Blind children and visually impaired children have no basis for a visual representation of their environment due to a complete loss or limited visual perception and loss of visual memory. Mainly they rely mainly on the sense of hearing and tactile channels to receive and learn the language. This way of learning may result in some deficiencies in the linguistic awareness skills. The reason for these deficiencies may be their inability to remember everything they learn by hearing, such as the words of the language they learn, whether it is the mother tongue or the second language. Some of these language and speech disorders may be such as limits on their writing expression in contrast to their peers with intact eyesight, similar letters such as /s, ʃ/, /k, q/, /ɪ, i/ and /ʊ, u/ may overlap, some distortions as replacing more than one letter in the word with other letters that change their meaning and thus not understanding what is meant to be said, as well as inability to determine the specifics of the words they hear, resulting in errors when spelling out the sound structure. The difficulties of decoding a phoneme in a word, which the blind and visually impaired children have, may be due to the fact that they do not have much opportunity to read compared to their visual peers. Therefore, they have less chance of understanding the relationship between letters and sounds, and also less chance of learning the sounds of a single letter, which contributes to the development of their ability to recall and write the letter when they hear one of its sounds, which causes slow phonological processing of what the child

hears and what is dictated to him while writing, as well as causes the child to replace similar letters when writing. Lonigan(٢٠٠٤a)

The study relies on a desktop application that helps blind children to improve their phonological discrimination process between the short vowels /u, ɪ, a/ and the long vowels /u:, i:, a:/ in familiar Arabic words which helps to avoid spelling errors that they make when writing in Braille, which causes a misunderstanding of the intent of these children.

Purpose of using desktop application for visual impaired children

Desktop programs are software installed directly on your computer. These are the kind of programs you find on your laptop or desktop, not ones you access through a web browser.

By incorporating technology, classrooms can become more engaging, which helps students remember information better. It also allows students to work together, fostering a learning environment where they can teach and learn from each other. All of this contributes to a more positive and motivating learning experience (Costley, ٢٠١٤).

Desktop applications offer offline capabilities, it allows staying active and functional without a data connection in contrast to the web applications, which need to have a data connection available to ensure there is availability for the program.

In this study the purposes of using a desktop application for the blind children are:

- To improve the phonological discrimination skills between Arabic vowels (short vowels and their counterparts of long vowels) in Arabic words.

- To help blind children to form new Arabic words and to write down correctly in Brail form.

- To make learning and education more interesting by using technology.

- To help blind children and parents to perform this kind of application easily at home.

- To improve the academic levels -in terms of spelling and reading- for the blind children to the level of their sighted peers.

Method and methodology

Subjects

The study group included ١٠ blind males aged from ٨-١٠ years old.

Inclusion criteria

- Totally blind and using Brail.
- Same social class
- No other disorders
- Normal IQ level.
- From same association (Alexandria Association for the Blind).

Method

A software program was designed with the collaboration with faculty of engineering and the input speech data was rely on the different Arabic words from of Dr Nakawa نقاوه (٢٠٠٦) book.

Speech Data

<u>Arabic short and long vowels</u>

Vowel	The name of Arabic vowels	Example	IPA code
V01	Short fatha	جَد	a
V02	Long fatha	جاد	a:
V03	Short dummah	جُد	u
V04	Long dummah	جود	u:
V05	Shot kasrah	جِد	i
V06	Long kasrah	جيد	i:
V07	Fatha dummah	جَوَد	aw
V08	Fatha kasrah	جَيد	ay

Figure ١: shows short and long Arabic vowels with examples.

<u>Arabic words used</u>

Appendix I shows the used Arabic words in the study containing the short and long Arabic vowels.

Collecting speech sample

Different methods were used to collect speech data:

- The data was elicited from each child individually in different sessions; a different exercise was performed in a different session.

- Mobile phones and smart phones: to record the session to be easily transcribed.

- Exercise forms: the exercise relied on the Dr Nakawa نقاوه (٢٠٠٦) Arabic words with Arabic vowels, the exercises were formulated to suit the conditions of blindness for Arab children.

Exercises used for collecting data

Four types of exercises were performed: **Spelling the sounds of the Arabic words** including short and long vowels. The aim of this exercise to know if he perceived and recognized the word sounds (vowels and consonants) right or not.

- **Exercise ١: Awareness of the vowels type.** The aim of this exercise is to ask the child whether the two words have the same vowel types or there is difference between them.

- **Exercise ٢: Recognition of Minimal pair's words (same Arabic words but differ only in type of vowel).** The aim of this training is to recognize the difference or compatibility of the two words (by asking whether the two words have the same vowel or not).

- **Exercise ٣: Discriminating the different word containing different vowel.** The aim of this exercise is to choose the word that contains a different vowel (either short or long Arabic vowel) than the rest of the words.

- **Exercise ٤: Choosing the right word to complete the sentence.** The purpose of this training is to complete the sentence with the right word from three words given to the child.

  Samples of the different exercises are shown in Appendix I.

Results

As examined in Table ١, it revealed that Arabic vowels could be divided into two categories, according to the duration into short and long vowels. The short vowels are three specifically /a/, /u/ and /i/. On the other hand, the long vowels are the other three that are /a:/, /u:/ and /i:/.

Vowels	/a/	/a:/	/u/	/u:/	/i/	/i:/
Max	٠.٥٤٧	٠.٩٣٩	٠.٥٢١	٠.٩٠١	٠.٥٥٨	٠.٨٨٢
Min	٠.٢٥١	٠.٥٢٧	٠.٢٣١	٠.٥٢٤	٠.٢٣١	٠.٥٠٥
Range	٠.٢٩٦	٠.٤١٢	٠.٢٩	٠.٣٧٧	٠.٣٢٧	٠.٣٧٧
Mean	٠.٣٦٤	٠.٦٩٠	٠.٣٨٦	٠.٦٩١	٠.٣٧٨	٠.٦٨٨
Ratio	٠.٥٢٧		٠.٥٥٨		٠.٥٥٠	
SD	٠.٠٧٩	٠.٠٩٩	٠.٠٩٦	٠.١٠٠	٠.٠٨٤	٠.٠٩٦

Table ١. Statistical measurements of vowel durations in seconds.

The mean duration of the three short vowels is ٠.٣٧٦ s in different words while that for the three long vowels is ٠.٦٨٩ s. in other words. Table١, also showed the directional similarity within these two groups of vowels.

The high front /i:/ has the shortest duration among all the long vowels while the low front /a/ has the shortest duration among all the short vowels. High vowels being shorter than low vowels because low vowels need extra time for lowering the jaw (Lehiste, ١٩٧٠, Lindblom, ١٩٦٧). From the previous

table, visual impaired children tended to aware and recognize the long vowels better than short vowels and high short/i/ vowels better than low short vowels/a/. As tabulated in Table ١, long vowel duration owned more than twice as compared to their short counterparts. The average mean for short vowels is ٠.٣٧٦ s and that for long vowels is ٠.٦٨٩ s, with a ratio of ٠.٥٤٥. The biggest difference between short and long vowels appears to be how long they are held. Table ١ also shows that the shortest duration is exhibited by the high front long vowel and low front short vowels. For instance, the difference between the high long vowel /i:/ and the nearest duration, that is found in the low front vowel /a:/ is ٠.٠٠٢ s. On the other hand, the durational difference between the low short vowel /a/ and the nearest duration in the group of short vowels, which is found in /i/, is ٠.٠١٤ s. However, the high back long vowels and low long vowels do not show much difference in their duration.
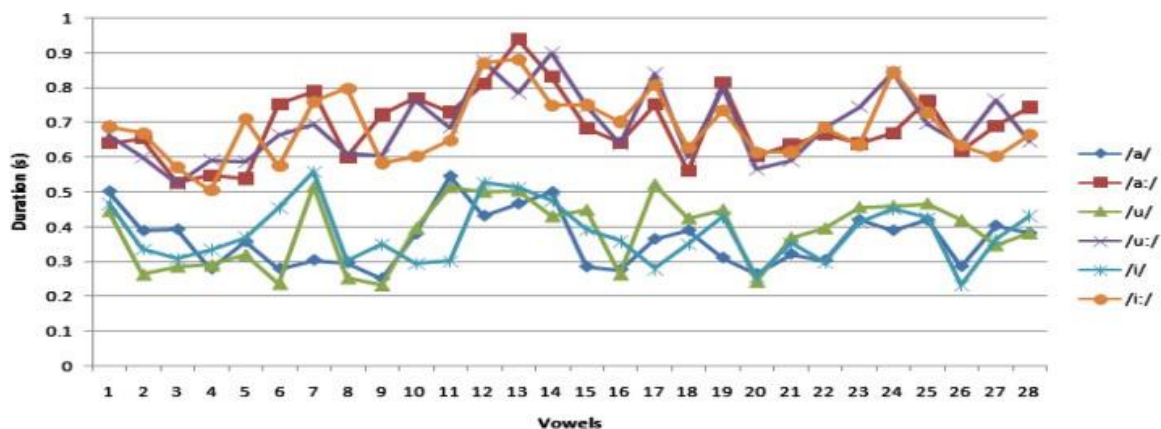

Fig. ١ shows the considerable variation in recognition of vowels (short and long vowels.) with different durational patterns

In figure ١, Vowel length distinction remains clear. Even when a short vowel is long, the corresponding long vowel spoken by the same speaker is

noticeably longer to maintain the contrast between short and long vowels in words. Therefore, the Recognition of Minimal pair's words (same Arabic words but differ only in type of vowel) is better in long vowels with long duration than short vowels with short duration.

Samples of the results of the participants

Participant ١:

Exercise	/a/	/aː/	/u/	/uː/	/i/	/iː/
First exercise	$\frac{8}{8}$	$\frac{8}{8}$	$\frac{6}{6}$	$\frac{6}{6}$	$\frac{6}{6}$	$\frac{6}{6}$
Second exercise	$\frac{10}{10}$	$\frac{4}{4}$	$\frac{5}{5}$	$\frac{5}{5}$	$\frac{4}{4}$	$\frac{10}{10}$
Third exercise	$\frac{5}{5}$	$\frac{4}{4}$	$\frac{3}{3}$	$\frac{6}{6}$	$\frac{3}{3}$	$\frac{6}{6}$
Fourth exercise	$\frac{1}{1}$	$\frac{3}{3}$	$\frac{2}{2}$	$\frac{1}{1}$	$\frac{1}{1}$	$\frac{2}{2}$
Total number of correct answers						
	$\frac{24}{24}$	$\frac{19}{19}$	$\frac{16}{16}$	$\frac{18}{18}$	$\frac{14}{14}$	$\frac{24}{24}$
Total percentage of correct answers						
	100%	100%	100%	100%	100%	100%

Total number of short vowels	Total number of Long vowels
$\frac{54}{54}$	$\frac{61}{61}$
Total percentage of short vowels	Total percentage of short vowels
100%	100%

Participant ٢:

Exercise	/a/	/aː/	/u/	/uː/	/i/	/iː/
First exercise	$\frac{8}{8}$	$\frac{8}{8}$	$\frac{6}{6}$	$\frac{5}{6}$	$\frac{4}{6}$	$\frac{4}{6}$
Second exercise	$\frac{10}{10}$	$\frac{4}{4}$	$\frac{1}{5}$	$\frac{3}{5}$	$\frac{2}{4}$	$\frac{10}{10}$
Third exercise	$\frac{5}{5}$	$\frac{4}{4}$	$\frac{3}{3}$	$\frac{5}{6}$	$\frac{3}{3}$	$\frac{6}{6}$
Fourth exercise	$\frac{1}{1}$	$\frac{3}{3}$	$\frac{2}{2}$	$\frac{1}{1}$	$\frac{1}{1}$	$\frac{2}{2}$
Total number of correct answers						
	$\frac{24}{24}$	$\frac{19}{19}$	$\frac{12}{16}$	$\frac{14}{18}$	$\frac{10}{14}$	$\frac{22}{24}$
Total percentage of correct answers						
	100%	100%	75%	77.7%	71.4%	91.6%
Total number of short vowels			Total number of Long vowels			
$\frac{46}{54}$			$\frac{55}{61}$			
Total percentage of short vowels			Total percentage of long vowels			
85%			90%			

Participant ٣:

Exercise	/a/	/aː/	/u/	/uː/	/i/	/iː/
First exercise	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{6}{6}$	$\frac{6}{6}$	$\frac{3}{6}$	$\frac{6}{6}$
Second exercise	$\frac{9}{10}$	$\frac{2}{4}$	$\frac{5}{5}$	$\frac{4}{5}$	$\frac{4}{4}$	$\frac{10}{10}$
Third exercise	$\frac{3}{5}$	$\frac{4}{4}$	$\frac{3}{3}$	$\frac{6}{6}$	$\frac{3}{3}$	$\frac{6}{6}$
Fourth exercise	$\frac{1}{1}$	$\frac{2}{3}$	$\frac{2}{2}$	$\frac{1}{1}$	$\frac{1}{1}$	$\frac{2}{2}$
Total number of correct answers						
	$\frac{18}{24}$	$\frac{13}{19}$	$\frac{16}{16}$	$\frac{17}{18}$	$\frac{11}{14}$	$\frac{24}{24}$
Total percentage of correct answers						
	75%	68.5%	100%	94.5%	78.5%	100%

Total number of short vowels			Total number of Long vowels		
$\frac{45}{54}$			$\frac{54}{61}$		
Total percentage of short vowels			Total percentage of short vowels		
83.3%			88.5%		

Discussion

According to the results, the performance of the ten subjects was better in long vowels discrimination in all exercises than short vowels. (The arithmetic mean percentage of correct answers of long vowels is ٩٣.١٪ and the arithmetic mean percentage of correct answers of short vowels is ٨٨.١٪.)

The discrimination between words which contain long vowels /i:/ and /u:/ or short vowels /i/ and /u/ is better than the discrimination between words which contain long vowel /a:/ or short vowel /a/. The reason for this is that when we examined the child's stages of acquisition, it became clear that the vowels /i/ and /u/ are easily auditory discriminated by the children.

The second type of exercise (awareness of the vowel) was the hardest type presented to the children. The reason for this performance was; the utterance is lengthen, it is easy to compare between the words and therefore easily to be discriminated.

The effectiveness of the four types of exercises that were presented to the blind children showed their positive impact in improving phonological discrimination for blind children, thus these exercises were transferred electronically to a desktop application so that all Arab blind children could benefit from them.

Finally, by increasing the number and expanding the social groups of the sample, we can see clearer differences between the level of these blind children, and the same goes if the children are sighted. Any differences in social and living conditions between the classes of society in general lead to differences in thought, educational and cultural levels.

Likewise, the environment surrounding the child, with its difference and the different level of care for children, leads to a difference in the extent of progress that the child will make in his educational career.

Practical Significance of the Study

The results of this research may be useful for speech-language pathologists (SLPs) in developing interventions for children who are visually impaired (VI).

It is important for practitioners to note that there is a high reported number of students with VI who are currently receiving or had received speech-language services for speech sound intervention. This number was much larger than the number of students in general education receiving received speech-language services, had received special education services for any reason. Since many students with VI need intervention, educators should thoroughly evaluate all students with VI to identify those who might benefit from additional support. The data suggests that a speech-language pathologist (SLP) involvement is especially crucial for children with mild intellectual disabilities. This study found a link between VI severity and speech-sound perception (SSP) problems in children with normal thinking skills. This means a SLP cannot expect a child with VI and normal thinking to automatically develop good SSP skills. It's important to intervene early for vision-impaired children who need speech help. Compared to regular classrooms, a higher percentage of young visually impaired students need speech services. This need continues into older grades for more visually impaired students. Since speech problems might take longer to fix, this delay could hurt their reading skills in the long run Brouweret al. (٢٠١٥)

The American Foundation for the Blind (٢٠١٤) offers guidance for educators and parents on developmental trajectories in children with VI, with relevant information offered regarding literacy acquisition.

Careful consideration of the development trajectory is particularly crucial for SLPs who provide interventions for students with VI. SLPs can support VI children by teaching parents and VI professionals about normal speech sound disorders (SSD) and when to seek an evaluation. SLPs can help by doing regular checks and observing students in class. This helps teachers pinpoint any potential issues. Even students who don't need special help can benefit from extra focus on language skills. Providing classroom activities designed to improve speech and language skills can be a big plus for all students, not just those needing specific interventions. The SLPs' careful selection of evidence-based intervention strategies and application of interventions with optimal intensity (Allen, ٢٠١٣) are relevant for providing children with VI with appropriate treatment.

Conclusion

Visual impaired children may be hindered by their lack of visual representation, but this does not prevent them from keeping pace with their sighted peers academically if they receive adequate training that develops their auditory and tactile abilities that can compensate them for vision loss. If these children are neglected and do not receive adequate training, it can cause a significant delay compared to the sighted, even if these sighted children are also neglected, because these sighted children have

the advantage of vision, while the blind will be blind and also unable to exploit the rest of their sensory abilities.

Charitable centers and associations to support the blind represent a major factor in improving the educational level of blind children along with the role of the school, especially if there are shortcomings on the role of the parents towards their children at home, as the extra hours that the child spends in learning increases his educational outcomes.

Study Limitations

There was some obstacles faced this study; no adequate assistance from blind care associations for researchers to perform their studies; the short time of permissible sessions as the children having other academic lessons in the association and finally , the Cooperation by those in charge of blind centers as well as schools for the blind, and their attempt to extend a helping hand to researchers in the affairs of people with disabilities and remove from their way the obstacles they face which hinder them from being able to help people with disabilities who they are researching about.

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Appendix I

Spelling the sounds of the Arabic words including short and long vowels.

● الفتحة ومد الألف:

نوع الخطأ	التحليل	كلمات بمد الألف	نوع الخطأ	التحليل	كلمات بالفتحة
-	[ج – ا – د]	جاد	-	[ص – د]	صَّد
-	[ص – ا – م]	صام	-	[ق – ل – م]	قَلم
-	[س – ا – ه – ر]	ساهر	-	[ع – ل – م]	عَلم
-	[ق – ا – ه – ر]	قاهر	-	[س – ل – م]	سَلِم
-	[غ – ذ – ا – ء]	غذاء	-	[ص – ل – ح]	صَلَح
-	[ت – ف – ا – ح - ة]	تفاحة	-	[م – د – ر – س – ة]	مَدرَسَة
-	[ك – ر – ا – س - ة]	كُراسة			

● الضمة ومد الواو:

نوع الخطأ	التحليل	كلمات بمد الواو	نوع الخطأ	التحليل	كلمات بالضمة
-	[ك – و – ب]	كوب	-	[ق – م]	قُم
-	[س – و – ر]	سور	-	[ر – د]	رُد
-	[ح – ب – و – ب]	حبوب	-	[ت – ف – ا – ح - ة]	ثُفاحة
-	[ط – ا – ب – و – ر]	طابور			

● الكسرة ومد الياء:

كلمات بمد الياء	التحليل	نوع الخطأ		كلمات بالكسرة	التحليل	نوع الخطأ
دين	[د – ي – ن]	-		سِر	[س – ر]	-
كيس	[ك – ي – س]	-		طِن	[ط – ن]	-
صين	[ص – ي – ن]	-		عامِر	[ع – ا – م – ر]	-
سَليم	[س – ل – ي – م]	-		عاقِر	[ع – ا – ق – ر]	-
مقيم	[م – ق – ي – م]	-		بِلاد	[ب – ل – ا – د]	-
				فاكِهة	[ف – ا – ك – ه – ة]	-

Exercise ١: Awareness of the vowels type.

ضمة/ مَد واو   فتحة/ مد ألف

الكلمة	الإجابة	نوع الخطأ		الكلمة	الإجابة	نوع الخطأ
سور - نور	√	-		سَد - مَد	√	-
دُب - لُب	√	-		شَق - دَق	√	-
رُبع - روح	√	-		عَد - عَض	√	-
حوت - حُر	√	-		رَقم - قَلم	√	-
دُب - دور	√	-		خَائب - خَتْم	√	-
				عادل - عَكس	√	-
				نام - قام	√	-

<div align="center">كسرة/ مد ياء</div>

نوع الخطأ	الإجابة	الكلمة
–	√	طين - تين
–	√	سِن - سيخ
–	√	عِلم - عيد
–	√	ضمير - كثير
–	√	شرير - خطير
–	√	دِقة - جِدة
–	√	طريقة - حقيقة

Exercise ٢: Recognition of minimal pair's words.

<div align="center">ضمة/ مد واو</div>

نوع الخطأ	الإجابة	الكلمة
–	√	فُل - فول
–	√	حُر - حور
–	√	رُمح - روح
–	√	ظهور - ظُهر
–	√	غصون - غُصن
–	√	رُمَان - رومان

<div align="center">فتحة/ مد ألف</div>

نوع الخطأ	الإجابة	الكلمة
–	√	عَد – عاد
–	√	شَع - شاع
–	√	حَر - حار
–	√	نم - نام
–	√	سَمِع - سامع
–	√	مَد – ماد
–	√	وَقع – واقع
–	√	طَلع - طالع

كسرة/ مد ياء

نوع الخطأ	الإجابة	الكلمة
-	√	بع - بيع
-	√	طين - طِن
-	√	رحيم - رحِم
-	√	عمِل - عميل
-	√	كريه - كرِه
-	√	علِم - عليم

Exercise ٣: Discriminating the different word containing different vowel.

فتحة/ مد ألف

الإجابة	الكلمات
قادر	عَلَم – **قادر** – قَلْم
نام	**نام** – رَد – فَتَح
سَمِحَ	سامح – ساهر – **سَمِحَ**

ضمة/ مد واو

الإجابة	الكلمات
سُم	**سُم** – سور - كوخ
حور	دُب – **حور** - حُر
(√) الثلاث كلمات لديهم واو مدية	نور – سرور – بيوت

كسرة/ مد ياء

الإجابة	الكلمات
سير	طين – **سير** - تين
فطن	فطير – **فطِن** – خبير
حَزن	سعيد – **حَزن** - حزين

Exercise ٤: Choosing the right word to complete the sentence.(words include short and long vowels)

فتحة/ مد ألف

الإجابة	الخيارات	الجملة
عاد	عَدّ – **عاد** – مّد	الولد .... من المدرسة.
الورد	**الورد** – الوارَد – القائد	الفلاح يروي ...
جازم	**حازم** – خَزم - حلِم	لدي صديق اسمه ...
الشارع	الشَرع - المسجد - **الشارع**	يلعب الولد في ...

ضمة/ مد واو

الإجابة	الخيارات	الجملة
الغراب	الكتاب – الغوراب - <u>الغراب</u>	شاهدت الفتاة ... في السماء.
الشروق	الشُرق – الطُرق - <u>الشروق</u>	محمد وعمر يسهران دومًا حتى ...
التُفاحةَ	التوفاحةَ – الجزر - <u>التُفاحةَ</u>	... هي فاكهتي المفضلةِ.

الإجابة	كسرة/ الخيارات	الجملة
الطين	<u>الطين</u> – الطِن - العجين	كنتُ أركض حتى وقعتُ في ...
مُحسِن	سَلِم – <u>مُحسِن</u> - مُحسين	... صديقِي من المدرسةِ.
كريم	<u>كريم</u> – بخيل - كُرم	من صفات صديقِي أنه ...