

The Velar-Lips in *jafʕal* Form of Arabic Present Tense

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Abstract—Arabic has three main vowels, which are the vowel /a/ (*fathah*), the vowel /i/ (*kasrah*), and the vowel /u/ (*dammah*). This study analyses the vowels of the Arabic Present Tense in *jafʕal* form which is related to the arrangement of letters. This study aims at helping Arabic language students who have difficulty determining the correct vowel of the three vowel fractions. In addition, this study can help linguists in general and Arabic linguists in particular to determine the vowel reading of the letter *ʕayn* (ع) on the active verb pattern of modern Arabic *jafʕal* which is divided into vowels /a/ (*fathah*), vowel /i/ (*kasrah*), and the vowel /u/ (*dammah*). This study applies a qualitative method. Al-Khali:l dictionary and al-Maʕaniy online dictionary were referred for data collection. Three syllable active verbs were analyzed as vowels for these three syllable active verbs in Arabic will change to three different vowels in the Present Tense of the verb. Based on the phonological method proposed by El-Wadi (2005), the analysis focused on the arrangement of the letters *ʕayn* (ع) in the Past Tense verb which is processed from the phonological method pioneered by Chomsky and Halle (1968). Clearly, the findings of the study have shown that there are effects on the vowel on the *ʕayn* (ع) active verb of the Arabic Present Tense caused by the arrangement of *ʕayn* (ع) on the active Arabic verb of the past. At the same time, this study provides an alternative that shows that the vowels at the position of the letter *ʕayn* (ع) of the active Arabic verb of the present time are non-random.

Index Terms—vowels, Arabic, active verbs, phonological rule, present tense

I. INTRODUCTION

One of the key components of learning the Arabic language is to learn and master its phonological rules. Yet, the students tend to struggle with Arabic language reading skills accurately despite having undergone intensive Arabic lessons for years ever since their early primary school days. Thus, they have for instance, a rather unsatisfying performance in Arabic writing. Nurazan et al (2020) argued that reading is a very crucial process that needs to be grasped and students of the Arabic language often have issues with their Arabic reading. Students of the Arabic language mostly come from religious schools and learned *tajweed* since primary school. *Tajweed* is a set of rules for the correct pronunciation of the letters with all their qualities and applying the various traditional methods of *Quran's* recitation. Yet they are unable to make use of *tajweed* knowledge in reading Arabic language texts. Studies on skills in reading Arabic texts pay attention to the ending vowels of each word such that they neglect the vowels on verbs that are also important elements in Arabic texts. This study focuses on the use of existing *tajweed* principles known to Arabic language students so that this knowledge can help them develop skills in reading active verbs in the Arabic language based on *tajweed* principles of topic articulation *ʕayn* (ع).

A. Categories of Verbs

Three syllable active verbs in the Arabic language are divided into three categories, namely *faʕala*, *faʕila*, and *faʕula* (Hamdani, 2010). Then, these categories change when in Present Tense (Al-Asbahy & Aleemudin, 2016). Category

faʕala changes into three types of Present Tense, namely *jaʕʕal*, *jaʕʕil*, and *jaʕʕul*. The category *faʕila* can change into two possible types, namely *jaʕʕal* and *jaʕʕil*. While the category *faʕula* can only change into one Present Tense type, namely *jaʕʕul*. These changes are not based on certain rules and were determined by the following usage by previous speakers (Al-Hilwani, 2008; Taha & Haddad, 2017). The following Table 1 gives examples of changes in category from Past Tense to Present Tense:

TABLE 1

Past Tense	Example of verb	Present Tense	Example of verb
<i>faʕala</i>	<i>samaħa</i>	<i>jaʕʕal</i>	<i>Jasmaħu</i>
<i>faʕala</i>	<i>ħaḍifa</i>	<i>jaʕʕil</i>	<i>Jahḍifu</i>
<i>faʕala</i>	<i>kataba</i>	<i>jaʕʕul</i>	<i>Jaktubu</i>
<i>faʕila</i>	<i>samiʕa</i>	<i>jaʕʕal</i>	<i>jasmaʕu</i>
<i>faʕila</i>	<i>ħasiba</i>	<i>jaʕʕil</i>	<i>Jahsibu</i>
<i>faʕula</i>	<i>ħasuna</i>	<i>jaʕʕul</i>	<i>Jahsunu</i>

This study offers a solution to the problem of determining the vowels for the letters in ʕayn (ع) for the active verb in the Arabic language *jaʕʕal* Present Tense among non-native speakers of Arabic in general, and also helps the students of Arabic in particular. This is because there is one principle in the Arabic language saying that shaping morphology and vowel on the Arabic language words is based on the usage of listening to (sima:ijj) speakers in the past (Al-Hilwani, 2008). This principle helps in reading the vowel at the place of the letter ʕayn (ع) correctly if they memorize certain verbs and often use these verbs in sentence construction or speech (Issa, 2022). Difficulty in reading the vowel at the place of the letter ʕayn (ع) occurs in rarely used active verbs and confusion happens in determining the correct vowel.

This study focuses on changes from category *faʕala* and *faʕila* only because the category *faʕula* will change to only one namely *jaʕʕul* in the Present Tense. The *faʕala* category may change into three possible categories in the Present Tense, namely *jaʕʕal*, *jaʕʕil*, and *jaʕʕul*. The *faʕila* category may change into two categories namely *jaʕʕal* and *jaʕʕil* in Present Tense. These two mentioned categories need analysis to determine the vowel for placement of ʕayn (ع) in the Present Tense.

B. Articulation

An articulation tool is a speech tool or tool involved in producing language sounds. Articulation tools are divided into two parts, namely articulator and area of articulation (Al-Bahansawi, 2005). The articulator is a part of the articulation tool that can be moved such as the tongue, lips, and lower teeth placed the lower part of the oral cavity (Al-Solami, 2013; Al-Ghamdi, 2015). Areas of articulation include the upper teeth, gums, hard and soft palate (Archangeli & Pulleyblank, 2022). These areas of speech tools are found in the upper oral cavity that cannot be moved and can only be approached or touched in the process of producing language sounds (Hasmadi, 2011).

Lip articulation is a component of the articulator. Lip articulation is placed outside the oral cavity and can obstruct the airflow and is divided into two parts namely lower and upper lips (Kkese, 2022). The lips function as the gatekeepers of the oral cavity. The upper lip (passive) cooperates with the lower lip (active) and top teeth, in generating sounds, for example: phonemes [p], [b], [w], [m], [f], and [v]. The lower lip can be lifted to close the oral cavity with the upper lip. The widening and rounding produce different language sounds. The lips also can block airflow out of the oral cavity (Dixon, 2002).

The back part of the tongue is going up and touching the soft palate is velar. The English sounds [k], [g], [ŋ] are velar sounds (Rahman, 2020), and the additional sound for Arabic velar is sound [q]. The tongue's ability to do the motions associated with trills or taps is severely constrained when it is in the velar position, and the body of the tongue lacks the mobility to move swiftly enough to produce a velar trill or flap. Because the soft palate area of the palate is relatively large and the movement of the back is not very accurate, the soft palate is easily absorbed and shifts the joint back and forth depending on the quality of the adjacent vowels (Dixon, 2002). Before a subsequent front vowel, they frequently automatically become fronted, which means partially or totally palatal, and retracted, which means partially or entirely uvular, before back vowels. This aligns with the division of articulation suggested by El-Wadi (2005) who placed the sounds *dʒim*, *qaf*, and *kaf* (ج, ق, ك) in specific articulation different from other articulations, namely the dorsals.

Hence, this study outlines three clear objectives. First, analyze the percentage of vowels in Present Tense Arabic verbs *jaʕʕal* based on the arrangement of the place of articulation. Second, to analyze the vowels in the Arabic verbs based on the arrangement of articulation patterns. Third, producing the method of reading vowels correctly for Present Tense Arabic verbs. The Arabic grammar restricted by principles of usage by past speakers will now be explained more systematically with the modern phonological approach and linguistic theory. These objectives are designed to answer these three questions: 1- How is the vowel frequency of Arabic Present Tense in *jaʕʕal* form based on the arrangement of the place of articulation? 2- What types of vowels in Arabic Present Tense in *jaʕʕal* form are produced from the arrangement of articulation pattern? And 3- What is the correct method of producing the correct vowel for Arabic Present Tense in *jaʕʕal* form?

II. LITERATURE REVIEW

Although both phonetics and phonology are concerned with the study of language, linguists have traditionally considered them separate fields of study (Levis & Munro, 2012). Phonetics covers the physical aspects of speech production and its relationship to speech recognition, while phonology deals with the functional and systematic properties of sounds in a particular language (Zahid, 2021). Understanding phonological rules and their purposes can help us comprehend our languages more clearly because they are a necessary component of all language communication, whether it be spoken or written. (Qadoury, 2022) Understanding the Arabic phoneme is essential to comprehending the function of phonological rules. A phoneme, in accordance with conventional phonological theories, is the smallest unit of a language's sound system (Naifah, 2018).

Yusuf et al. (2015) found that a concerted effort is needed for determining the vowel in the letter *ṣayn* (ع) position besides having to memorize the vowel for all letters occupying the letter *ṣayn* (ع) position in the Present Tense verb of form *yafʿal*. Assignment of vowels can also be done through the approach of similarity if the verb built from letters is almost similar, such as the arrangement of the letter *dal* (د) and *qaf* (ق) with *ḥal* (ح) and *qaf* (ق). The vowel /u/ (dhommah) in the letter *ṣayn* (ع) position occurs more frequently than the vowel /i/ (kasrah).

Dollah and Azlina (2014) support the opinion of Ibn Jinni (2000) in line with modern phonology that the vowel *ṣayn* (ع) Past Tense differs from the vowel Present Tense, unless other factors exist, such as the placement of letter *ṣayn* (ع) such as the letter is built from letters arising from uvular articulation that produces the vowel /a/ (fathah) in the place of letter *ṣayn* (ع) in Present Tense. They also support the opinion of Ibn Jinni that the function of a verb in speech influences the vowel in Past Tense whether vowel /a/ (fathah), vowel /i/ (kasrah), or vowel /u/ (d'ammah). Dialect also influences the vowel for the letter placed in the *ṣayn* (ع) Present Tense position. They also stated that many past and modern language experts concluded that these verbs have six patterns determined by language experts in the past. Because the patterns were not fixed, the vowel of the letter *ṣayn* (ع) Present Tense was seen as determined only by the usage of past speakers.

Idris (2014) clarified that vowels /a/, /i/, and /u/ when in active verb Present Tense *jafʿal* are based on the function and meaning of the verb. Vowel /a/ is for verbs having the meaning or related to fear, obstacles, hurting, cutting, giving, caring, leaving, and hating. The vowel /i/ is used when the verb means demanding, determining, journeying, voice, thirst, cutting, and giving. Whereas vowel /u/ is for tranquillity, nutrition, work, fear, sound, movement, height, and ending/finishing. His study shows that sameness occurs in several verb meanings such as cutting, giving, fearing, and some other words (Anis, 1999). This poses problems for students since the vowel only depends on, or is determined by, the meaning of the verb. The findings could not effectively help students because they had limited vocabulary and so they could not put the correct vowelization for the letter *ṣayn* (ع) unless they knew the verb meaning.

Skill in reading the Arabic language involves skill in determining the vowel for each letter, whether for verb, noun, or adjective. Because of this, students face problems in reading Arabic texts correctly (Syazri, 2021). Many studies related to skills in reading Arabic texts have been carried out from various aspects (Ilmiani & Delima, 2021).

Abdul et al. (2017) found that teachers rarely vary their teaching activities when teaching reading skills such as using authentic objects in explaining word meanings. Similarly with the use of synonyms, antonyms, and matching words with pictures. In essence, using real objects in explaining word meaning can reinforce students' memory when they memorize the Arabic language vocabulary (Syahri, 2020). The drawback of this approach is that it is only suited to words involving nouns in the Arabic language and is limited to certain words only.

Through the researcher's experience, among the other aspects often neglected is the method of determining vowels in verbs when reading Arabic language texts. Verbs in Arabic language have many shapes and are made of three main vowels (Abdelgadir, 2021), namely /a/ (fathah), /i/ (kasrah) and /u/ (d'ammah). Problems often arise when students fail to determine the right vowel for the verb encountered in the text. Various studies and suggestions have been presented and offered to overcome this problem. Nevertheless, students still fail to assign the right vowel when reading Arabic texts. Past studies focused on grammar for individual words by taking varied approaches (Maziyah, 2018). Yet until today students still are burdened by failure to assign the right vowels when reading Arabic texts. The current study is thus focused on tajweed rules (tajweed rules) that can be used by students to overcome the problem of determining vowels for verbs in reading Arabic texts without vowel signs. The tajweed rules learned during primary school can be used as a guideline for determining vowels when reading Arabic language texts. Problems in reading Arabic texts are related to a lack of knowledge in relating tajweed rules and techniques reading Arabic texts. This is a great loss because tajweed rules learned in the past are not applied when reading unvowelled Arabic texts hence causing errors (wrong vowels) when reading Arabic texts.

III. RESEARCH METHODOLOGY

This study was done using qualitative methodology, using the generative phonetic theory (Chomsky & Halle, 1968) and based on the framework adopted by Ibn Jinni (2000) and adapted by El-Wadi (2005) in producing an approach or method of phonetics for determining the vowel in the letter *ṣayn* (ع) place in Present Tense *jafʿal* for Arabic verbs. The qualitative method was used because all three syllable verbs in a dictionary that relate to the research problem can be collected holistically. This was aimed at facilitating data analysis with correct data. Next, the identified data were analyzed guided by the theoretical framework. This qualitative study is a literature study based on documentary sources.

For data collection, the appropriate method used is document analysis rather than field study. Document analysis involves data and information collected by previous researchers. The researcher carried out documentary research by searching through existing data from al-xalil dictionary as the sample for this study. The data only focused on consonant verbs without involving glide verbs because most of the Arabic glide verbs apply the deletion rule. The researcher needed to identify the arrangement of letters shaping the data. Subsequently, the data were classified according to articulation.

For data analysis, the researcher divided articulation into ten parts, namely lips (L) for the letters *faʔ*, *baʔ*, and *mim* (ف, ب, م), Coronal one (CR1) for letters *dal*, *taʔ*, and *tʔaʔ* (ط, ت, د), Coronal two (CR2) for letters *sin*, *sʔad*, and *zai* (س, ز, ض), Coronal three (CR3) for the letters *θaʔ*, *dʔal*, and *Zhoʔ* (ث, ذ, ظ), Uvular one (U1) for letters *hamzah*, *Haʔ*, *ʕayn*, and *haʔ* (هـ, ع, ح, ا), Uvular two (U2) for letters *xaʔ* and *yaʔ* (خ, غ), velar (VR) for the letters *jim*, *qaf*, and *kaf* (ج, ق, ك), Middle of tongue (MT) for the letter *fʔin* (ش), Side of the tongue (ST) for the letter *dʔad* (ض) and Sonorant tongue tip (STT) for the letters *raʔ*, *lam*, and *nun* (ر, ل, ن). (Al-Bahansawi, 2005). A summary of the categorization of articulation by the researcher is given in Table 2:

TABLE 2
ARTICULATION, CODE FOR EACH ARTICULATION, AND LETTER

Articulations	Code	Letters of the Alphabet	Articulations	Code	Letters of the Alphabet
Lips	L	<i>faʔ</i> , <i>baʔ</i> and <i>mim</i> (ف, ب, م)	Uvular two	U2	<i>xaʔ</i> and <i>yaʔ</i> (خ, غ)
Coronal one	CR1	<i>dal</i> , <i>taʔ</i> , and <i>tʔaʔ</i> (ط, ت, د)	Velar	VR	<i>dʔim</i> , <i>qaf</i> , and <i>kaf</i> (ج, ق, ك)
Coronal two	CR 2	<i>sin</i> , <i>sʔad</i> , and <i>zai</i> (س, ز, ض)	Middle of tongue	MT	<i>fʔin</i> (ش)
Coronal three	CR 3	<i>θaʔ</i> , <i>dʔal</i> , dan <i>θʔoʔ</i> (ث, ذ, ظ)	Side of tongue	ST	<i>dʔad</i> (ض)
Uvular one	U1	<i>hamzah</i> , <i>Haʔ</i> , <i>ʕayn</i> , and <i>haʔ</i> (هـ, ع, ح, ا)	Sonorant tongue tip	STT	<i>raʔ</i> , <i>lam</i> , and <i>nun</i> (ر, ل, ن)

Then, the data were arranged based on the arrangement of letters. The researcher used second letter placement as the main arrangement, placement of the third letter as the second arrangement, and placement of the first letter as the third arrangement category. This is in line with the findings of Ibn Jinni (2000), El-Wadi (2005), Dollah and Azlina (2014), and Yusuf et al. (2015) who explained the position of the second and the third letters constructed from the epiglottis (Uvular one (U1)) articulation will produce the vowel /a/ for the letter in the second position. Then, the researcher categorized data into three categories, first vowel /a/ (*fathah*), second the vowel /i/ (*kasrah*), and third the vowel /u/ (*dʔammah*).

Subsequently, the phonological approach introduced by Chomsky and Halle (1968) based on the concept of generative linguistics was used for data analysis. Chomsky and Halle (1968) clarified that the phonological components contain a system rule relating the surface structure to phonetic representation. The phonology rule has the characteristic of permanence and specific arrangement. The phonological rule is as follows:

$$A \longrightarrow B / X _ Y]_k$$

This rule shows that element A will change to element B if A occurs between X and Y in the class of verbs. The arrow symbol means to change or transforms, while the underscore means the place of change occurs in the phonological rule.

El-Wadi (2005) revised this rule for the approach of Arabic language phonology that forms the basis of this study (Alotaibi, 2020). Based on Ibn Jinni (2000) stated that the vowel in a letter placed in *ʕayn* (ع) position in the Present Tense will be read with the vowel /a/ (*fathah*) if the letter that shapes the placement of *ʕayn* (ع) and *lam* (ل) is made up of a velar letter. The rule derived by El-Wadi is as in the following:

$$[+ \text{high}] \longrightarrow [+ \text{low}] / _ [+ \text{epiglottis}]$$

Isa (2019) refined the rule derived by El-Wadi (2005) as it only detailed the place of the vowel before the letter with the feature [+ epiglottis] (uvular) whereas the vowel after the letter [+ epiglottis] also takes the vowel /a/. The revised rule is:

$$[+ \text{Vowel}] \longrightarrow /a/ \left/ \begin{array}{l} _ [+ \text{epiglottis}] \\ [+ \text{epiglottis}] _ \end{array} \right\}$$

Through this rule, the researcher produced other rules in determining the reading of vowel for the letter *ʕayn* (ع) in Present Tense verb *jafʔal* that is divided into vowels /a/, /i/, and /u/, considering that the rule of El-Wadi (2005) and Isa (2019) only involved vowel /a/ for the letter [+ epiglottis]. Determining this vowel was a research problem because there was no specific rule in the Arabic language for determining the change in vowel from Past Tense to Present Tense. The application of the phonological approach will be shown in the data analysis section which will focus on velar and lip articulation (*mim* (م) only).

IV. ANALYSIS OF FINDINGS

Out of 3521 verbs involving consonants in Past Tense from *al-xali:l* dictionary, a table of three syllable verbs was arranged based on the arrangement of articulation that shaped each verb. Articulation found on the second syllable was the first focus of study followed by articulation on the third syllable position, ending with articulation for the first syllable position. This was the arrangement recommended by Ibn Jinni (2000) based on his observation of vowel /a/ that is positioned in the letter *ʕayn* (ع) in Present Tense verbs when the place of letter *ʕayn* (ع) and *lam* (ل) is shaped by letters arising from uvular (epiglottis) articulation, as in *hamzah*, *Haʕ*, *ʕayn*, and *haʕ* (هـ, ع, ح).

Letters formed by velar articulation, namely *dʒim*, *qaf*, and *kaf* (ج, ق, ك) are placed in position *ʕayn* (ع) at three syllables consonant verbs numbered in total 417 data points. The category verb *faʕala* changes to *jaʕʕal* for 56 data points (13.43%), the change to verb *jaʕʕil* numbers 57 data points (13.67%), and the category verb *jaʕʕul* numbers 191 data points (45.8%). Meanwhile, for the verb type *faʕila*, some 113 data points (27.1%) showed a change to the type *jaʕʕal* without any change to the type *jaʕʕil*.

Past Tense		Present Tense Form	Frequency	Percentage (%)
<i>faʕala</i>	→	<i>jaʕʕal</i>	56	13.43
<i>faʕala</i>	→	<i>jaʕʕil</i>	57	13.67
<i>faʕala</i>	→	<i>jaʕʕul</i>	191	45.8
<i>faʕila</i>	→	<i>jaʕʕal</i>	113	27.1
<i>faʕila</i>	→	<i>jaʕʕil</i>	0	0
Total			417	100

Figure 1. Frequency Distribution for Change in Vowel for Second Syllable Lip Articulation in Second Placed Letter *ʕayn* (ع) in the Second Syllable for Ttype *faʕala*

Out of 417 data points, 87 involve verb Past Tense three syllable consonants constructed from letters arising from velar articulation on the second syllable and letters from lip articulation as in *faʕ*, *baʕ* and *mim* (ف, ب, م) on the third syllable. The data were analyzed based on the articulation the second and third syllables.

Second syllable (Velar (VR))	Third syllable (Lips (L))	Vowel /a/	Vowel /i/	Vowel /u/	Total
<i>dʒim</i> (ج)	<i>faʕ</i> (ف)	2	1	4	7
<i>qaf</i> (ق)	<i>faʕ</i> (ف)	5	2	2	9
<i>kaf</i> (ك)	<i>faʕ</i> (ف)	3	0	1	4
<i>dʒim</i> (ج)	<i>baʕ</i> (ب)	2	0	4	6
<i>qaf</i> (ق)	<i>baʕ</i> (ب)	6	0	7	13
<i>kaf</i> (ك)	<i>baʕ</i> (ب)	3	1	4	8
<i>dʒim</i> (ج)	<i>mim</i> (م)	4	2	8	14
<i>qaf</i> (ق)	<i>mim</i> (م)	6	2	6	14
<i>kaf</i> (ك)	<i>mim</i> (م)	1	2	9	12
Total					87

Figure 2. Frequency Distribution of Vowel Involving Velar Articulation on Second Syllable and Lips Articulation (L) in the Third Syllable in Present Tense.

Because of time constraints, this study only focuses on the letter *mim* (م) in the third syllable because it shows the highest frequency of 40 data points (45.98%) compared to the letter *baʕ* (ب) with 27 data points (31.03%) and *faʕ* (ف) with 20 data points (22.99%).

V. DISCUSSION

A. Letter *dʒim* (ج) in Second Syllable and Letter *mim* (م) in Third Syllable

For the verbs constructed from the letter *dʒim* (ج) in the second syllable and letter *mim* (م) in the third syllable, two data points show that *dʒim* (ج) is read with vowel /i/. The first data point is when the first syllable of the verb is constructed from Uvular one (U1) articulation, as in the letter *hamzah* (هـ), in the Past Tense *ʔa/dʒa/ma* that changes into the Present Tense form *jaʕ/dʒi/mu*, while the second data point involves Lip (L) articulation as in the letter *baʕ* (ب) in Past Tense *ba/dʒa/ma* that changes into the Present Tense form *jab/dʒi/mu*, as illustrated in the following Table 3:

TABLE 3
VOWEL /i/ FOR THE LETTER *dzim* IN THE SECOND SYLLABLE AND LETTER *mim* IN THIRD SYLLABLE PRESENT TENSE

Past Tense	Present Tense	Past Tense	Present Tense
1- <i>ʔadʒama</i>	→ <i>jaʔdʒimu</i>	2- <i>badʒama</i>	→ <i>jabdʒimu</i>
<i>أَجَمَ</i>	→ <i>يَأْجِمُ</i>	<i>بَجَمَ</i>	→ <i>يَبْجِمُ</i>

Vowel /a/ is read in the second syllable a total of four times for the letter *dzim* (ج) in the second syllable for Present Tense form. The first data point involves a first syllable built from Coronal one (CR1) articulation as in the letter *dal* (د) in the Past Tense *da/dʒi/ma* that changes into the Present Tense form *jad/dʒa/mu*. The second involves the Side of tongue (ST) articulation as in the letter *dʿad* (ض) in Past Tense *dʿa/dʒi/ma* that changes to the Present Tense form *jadʿ/dʒa/mu*. The third data point is the Coronal three (CR3) as in the letter *θaʔ* (ث) in the Past Tense *θa/dʒi/ma* that changes into the Present Tense form *jaθ/dʒa/mu*, while the fourth data involves Lip (L) articulation namely in the letter *faʔ* (ف) in the Past Tense *fa/dʒi/ma* that changes to the Present Tense form *jaf/dʒa/mu*. The vowel change is explained in the following Table 4.

TABLE 4
VOWEL /i/ FOR LETTER *dzim* IN SECOND SYLLABLE AND LETTER *mim* IN THIRD SYLLABLE PRESENT TENSE.

Past Tense	Present Tense	Past Tense	Present Tense
1- <i>dadʒima</i>	→ <i>jaddʒamu</i>	2- <i>θadʒima</i>	→ <i>jaθdʒamu</i>
<i>دَجِمَ</i>	→ <i>يُدْجِمُ</i>	<i>ثَجِمَ</i>	→ <i>يُثْجِمُ</i>
3- <i>dʿadʒima</i>	→ <i>jadʿdʒamu</i>	4- <i>fadʒima</i>	→ <i>jafʒamu</i>
<i>ضَجِمَ</i>	→ <i>يَضْجِمُ</i>	<i>فَجِمَ</i>	→ <i>يُفْجِمُ</i>

Vowel /u/ is read in the second syllable in eight data points for the letter *dzim* (ج) in second syllable Present Tense form. The first, second, and third data points involve the first syllable constructed from Uvular one (U1) as in the letter *haʔ* (هـ) in the Past Tense *ha/dʒa/ma* that changes into the Present Tense form *jah/dʒu/mu*, the letter *ħaʔ* (ح) in the Past Tense *ħa/dʒa/ma* that changes into the Present Tense form *jah/dʒu/mu*, and the letter *ʕayn* (ع) in the Past Tense *ʕa/dʒa/ma* that changes into the Present Tense form *jaʕ/dʒu/mu*. The fourth data point involves Coronal one (CR1) articulation as in the letter *dal* (د) in the Past Tense *da/dʒa/ma* that changes into the Present Tense form *jad/dʒu/mu*. The vowel change is explained in the following Table 5:

TABLE 5
VOWEL /u/ FOR THE LETTER *dzim* IN SECOND SYLLABLE AND LETTER *mim* IN THIRD SYLLABLE PRESENT TENSE.

Past Tense	Present Tense	Past Tense	Present Tense
1- <i>ħadʒama</i>	→ <i>jahdʒumu</i>	2- <i>ʕadʒama</i>	→ <i>jaʕdʒumu</i>
<i>حَجِمَ</i>	→ <i>يُحْجِمُ</i>	<i>عَجِمَ</i>	→ <i>يُعْجِمُ</i>
3- <i>dadʒama</i>	→ <i>jaddʒumu</i>	4- <i>sadʒama</i>	→ <i>jasdʒumu</i>
<i>دَجِمَ</i>	→ <i>يُدْجِمُ</i>	<i>سَجِمَ</i>	→ <i>يُسْجِمُ</i>
5- <i>sadʒama</i>	→ <i>jasdʒumu</i>	6- <i>zadʒama</i>	→ <i>jazdʒumu</i>
<i>سَجِمَ</i>	→ <i>يُسْجِمُ</i>	<i>زَجِمَ</i>	→ <i>يُزْجِمُ</i>
7- <i>radʒama</i>	→ <i>jardʒumu</i>	8- <i>θadʒama</i>	→ <i>jaθdʒumu</i>
<i>رَجِمَ</i>	→ <i>يُرْجِمُ</i>	<i>ثَجِمَ</i>	→ <i>يُثْجِمُ</i>

The fifth and sixth data points involve Coronal two (CR2) articulation as in the letter *sin* (س) in the Past Tense *sa/dʒa/ma* that changes to the Present Tense form *jas/dʒu/mu*, and the letter *zai* (ز) in the Past Tense *za/dʒa/ma* that changes to the Present Tense form *jaz/dʒu/mu*. The seventh data point involved Sonorant tongue tip (STT) articulation as in the letter *raʔ* (ر) in the verb *ra/dʒa/ma* that changes to the Present Tense form *jar/dʒu/mu* and eight data points involving Coronal three (CR3) articulation, namely the letter *θaʔ* (ث) in the Past Tense *θa/dʒa/ma* that changes into the Present Tense form *jaθ/dʒu/mu*. From the findings as shown in Tables 4, 5, and 6, three phonological rules can be

proposed as pioneered by Chomsky and Halle (1968) and later revised by El-Wadi (2005) and refined by Isa (2019), as in the following:

R1: [+ vowel] \longrightarrow /a/ / {U1, L} *dzim* __ *mim* [faʕila Past Tense form]

Rule one (R1) shows that the letter *dzim* placed on the second syllable will be read with the vowel /a/ if the first syllable is built by Uvular one (U1) articulation as in the letter *hamzah* (ء) and Lip (L) articulation as in the letter *baʕ* (ب) from the Past Tense form *faʕila*.

R2: [+ vowel] \longrightarrow /i/ / {U1, L} *dzim* __ *mim* [faʕala Past Tense form]

Rule two (R2) shows that the letter *dzim* placed in the second syllable will be read with the vowel /i/ if the first syllable is constructed from Coronal one (CR1) articulation, as in letter *dal* (د), Coronal three (CR3) articulation, namely letter *ḥaʕ* (ح), Side of tongue (ST) articulation as in the letter *dʕad* (ض), and Lip (L) articulation as in the letter *baʕ* (ب) from Past Tense form *faʕala*.

R3: [+ vowel] \longrightarrow /u/ / {U1, CR1} *dzim* __ *mim*

Rule three (R3) says that the letter *dzim* placed on the second syllable will be read with the vowel /u/ if the first syllable is built from Uvular one (U1) articulation as in the letter *haʕ* (هـ), *haʕ* (ح), and *ʕayn* (ع), Coronal one (CR1), namely the letter *dal* (د), Coronal two (CR2) articulation as in the letter *sin* (س) and letter *zai* (ز), Sonorant tongue tip (STT) articulation as in letter *raʕ* (ر), and Coronal three (CR3) articulation as in the letter *ḥaʕ* (ح).

Based on findings displayed in Tables 4, 5, and 6, there are 14 data points related to the letter *dzim* (ج) in the second syllable and letter *mim* (م) in the third syllable. If the student reads a text or encounters a Present Tense verb constructed by the letter *dzim* (ج) in the second syllable and letter *mim* (م) in the third syllable, eight (8) data points (57.14%) show that the letter *dzim* (ج) in the second syllable is read with the vowel /u/ (*dʕammah*), four (4) data points (28.57%) read with vowel /a/ (*fathah*) and two (2) data points (14.29%) read with vowel /i/ (*kasrah*) as explained in the following Figure 3:

Second syllable (Velar (VR))	Third syllable (Lips (L))	Vowel /a/	Vowel /i/	Vowel /u/
<i>dzim</i> (ج)	<i>mim</i> (م)	4	2	8

Figure 3. Frequency Distribution of Vowel Involving Letter *dzim* in the Second Syllable Lips Articulation in Present Tense Third Syllable.

B. Letter *qaf* (ق) in Second Syllable and Letter *mim* (م) in Third Syllable

For a verb constructed from *qaf* (ق) in the second syllable and letter *mim* (م) in the third, two data points show that the second syllable Present Tense is read with vowel /i/, which means *jaffil* for the verb in Present Tense. The first data point involves the first syllable shaped by Uvular One (U1) articulation as in the letter *ʕayn* (ع) in the Past Tense verb *ʕa/qa/ma* which changes to the Present Tense form *jaʕ/qi/mu*. The second data involves Sonorant tongue tip (STT) articulation namely the letter *nun* (ن) in Past Tense *na/qa/ma* that changes to the Present Tense *jan/qi/mu*. The verbs are in the following in Table 6.

TABLE 6. VOWEL /i/ FOR LETTER <i>qaf</i> IN THE SECOND SYLLABLE AND LETTER <i>mim</i> IN THIRD SYLLABLE PRESENT TENSE			
Past Tense	Present Tense	Past Tense	Present Tense
1- <i>ʕaqama</i>	\longrightarrow <i>jaʕqimu</i>	2- <i>naqama</i>	\longrightarrow <i>janqimu</i>
عَقَمَ	\longrightarrow يَعْقِمُ	نَقَمَ	\longrightarrow يَنْقِمُ

For the second syllable that is read with vowel /a/, there are six data points from the Present Tense form *jaffal*. The first and second data points involve the first syllable built from Uvular One (U1) articulation as in the letter *ʕayn* (ع) in the Past Tense verb *ʕa/qa/ma* that changes into the Present Tense form *jaʕ/qa/mu* and the letter *haʕ* (هـ) in the Past Tense verb *ha/qa/ma* that changes into the Present Tense form which is *jah/qa/mu*. The third and fourth data points involve Sonorant tongue tip (STT) articulation as in the letter *nun* (ن) in the Past Tense *na/qa/ma* that changes into the Present Tense *jan/qa/mu* and letter *raʕ* (ر) in the Past Tense *ra/qa/ma* that changes into the Present Tense *jar/qa/mu*. The fifth data point involves Coronal one (CR1) articulation namely for the letter *dal* (د) in Past Tense *da/qa/ma* that changes to the Present Tense *jad/qa/mu*. The sixth data point involves Lip (L) articulation as in the letter *faʕ* (ف) in Past Tense *fa/qa/ma* that becomes the Present Tense *jaf/qa/mu*. The form change is shown in the following in Table 7:

TABLE 7
VOWEL /a/ FOR LETTER *qaf* IN THE SECOND SYLLABLE
AND LETTER *mim* IN THE THIRD SYLLABLE PRESENT TENSE.

Past Tense		Present Tense	Past Tense		Present Tense	Past Tense		Present Tense
1- <i>ṣaqima</i>	→	<i>jaṣqamu</i>	2- <i>haqima</i>	→	<i>jahqamu</i>	3- <i>raqima</i>	→	<i>jarqamu</i>
عَقِمَ	→	يَعْقِمُ	هَقِمَ	→	يَهْقِمُ	رَقِمَ	→	يَرْقِمُ
4- <i>naqima</i>	→	<i>janqamu</i>	5- <i>daqima</i>	→	<i>jadqamu</i>	6- <i>faqima</i>	→	<i>jafqamu</i>
نَقِمَ	→	يَنْقِمُ	دَقِمَ	→	يَدْقِمُ	فَقِمَ	→	يَفْقِمُ

For the second syllable read with vowel /u/, there are six data points in the Present Tense form *jafʕul*. The first one involves the first syllable constructed from Uvular One (U1) articulation as in the letter *ṣayn* (ع) in the Past Tense verb *ṣa/qa/ma* that changes into the Present Tense form which is *jaṣ/qu/mu*. The second data point involves Coronal one (CR1) articulation as in the letter *dal* (د) in the Past Tense *da/qa/ma* that changes into the Present Tense form *jad/qu/mu*. The third data relates to Coronal two (CR2) articulation as in the letter *zai* (ز) in the Past Tense *za/qa/ma* that changes into the Present Tense form which is *jaz/qu/mu*. The fourth and fifth data points involve Sonorant tongue tip (STT) articulation namely the letter *raʔ* (ر) in the Past Tense *ra/qa/ma* that changes into the Present Tense *jar/qu/mu*, and letter *lam* (ل) in the Past Tense *la/qa/ma* that morphs into the Present Tense *jal/qu/mu*. The sixth data point involves Lip (L) articulation as in the letter *faʔ* (ف) in the Past Tense *fa/qa/ma* that changes into the Present Tense *jaf/qu/mu*. The form changes are shown in the following in Table 8:

TABLE 8
VOWEL /u/ FOR LETTER *qaf* IN SECOND SYLLABLE AND LETTER *mim*
IN THIRD SYLLABLE VERB PRESENT TENSE

Past Tense		Present Tense	Past Tense		Present Tense	Past Tense		Present Tense
1- <i>ṣaqama</i>	→	<i>jaṣqumu</i>	2- <i>daqama</i>	→	<i>jadqumu</i>	3- <i>zaqama</i>	→	<i>jazqumu</i>
عَقِمَ	→	يَعْقِمُ	دَقِمَ	→	يَدْقِمُ	زَقِمَ	→	يَزْقِمُ
4- <i>raqama</i>	→	<i>jarqumu</i>	5- <i>laqama</i>	→	<i>jalqumu</i>	6- <i>faqama</i>	→	<i>jafqumu</i>
رَقِمَ	→	يَرْقِمُ	لَقِمَ	→	يَلْقِمُ	فَقِمَ	→	يَفْقِمُ

As shown in the findings in Tables 6, 7, and 8, three phonological rules can be proposed using the framework pioneered by Chomsky and Halle (1968) and revised by El-Wadi (2005) and refined by Isa (2019); the rules are:

R4: [+ vowel] → /a/ / {U1, CR1, STT, L} *qaf* __ *mim* [*faṣila* Past Tense form]

Rule four (R4) shows that the letter *qaf* placed on the second syllable will be read with vowel /a/ if the first syllable is built from Uvular one (U1) articulation, namely the letter *ḥaʔ* (ح) and *ṣayn* (ع), Coronal one (CR1) articulation, as in letter *dal* (د), Sonorant tongue tip (STT) articulation as in the letter *raʔ* (ر) and *nun* (ن), and Lips (L) articulation as in letter *faʔ* (ف) from Past Tense form *faṣila*.

R5: [+ vowel] → /i/ / {U1, STT} *qaf* __ *mim* [*faṣala* Past Tense form]

Rule five (R5) states that the letter *qaf* placed in the second syllable will be read with vowel /i/ if the first syllable was constructed from Uvular one (U1) articulation, as in the letter *ṣayn* (ع) and Sonorant tongue tip (STT) articulation as in the letter *nun* (ن) from Past Tense form *faṣala*.

R6: [+ vowel] → /u/ / {U1, CR1, CR2, STT, L} *qaf* __ *mim*

Rule six (R6) shows that the letter *qaf* placed in the second syllable will be read with the vowel /u/ if the first syllable was constructed from Uvular one (U1) articulation as in the letter *ṣayn* (ع), Coronal one (CR1) as in *dal* (د), Coronal two (CR2) as in letter *zai* (ز), Sonorant tongue tip (STT) articulation as in the letter *raʔ* (ر) and lam (ل) and Lip (L) articulation as in the letter *faʔ* (ف).

Based on findings displayed in Tables 6, 7, and 8, there are 14 data points related to the letter *qaf* (ق) in the second syllable and the letter *mim* (م) the third syllable. If the student reads text or encounters a Present Tense active verb constructed from the letter *qaf* (ق) in the second syllable and letter *mim* (م) the third syllable, six (6) data points (42.86%) show that the letter *qaf* (ق) in the second syllable is read with the vowel /a/ (*fathah*) if built from the *faṣila* form, six (6)

data points (42.86%) are read with vowel /u/ (*d^ʕammah*), and two (2) data points (14.27%) are read with the vowel /i/ (*kasrah*) in the following in Figure 4:

Second syllable (Velar (VR))	Third syllable (Lips (L))	Vowel /a/	Vowel /i/	Vowel /u/
<i>qaf</i> (ق)	<i>mim</i> (م)	6	2	6

Figure 4. Frequency Distribution for Vowels Involving Letter *qaf* on the Second Syllable and Letters From Lip Articulation on the Third Syllable

C. Letter *kaf* (ك) in the Second Syllable and Letter *mim* (م) in the Third Syllable

For verbs constructed from *kaf* (ك) in the second syllable and letter *mim* (م) in third syllable, only one data point shows the second syllable Present Tense is read with the vowel /a/, namely the category *jafʕal* for the verb in Present Tense, that involves Lip (L) articulation as in the letter *baʔ* (ب) in the Past Tense verb *ba/ka/ma* that changes into the Present Tense form which is *jab/ka/mu*, in the following in Table 9.

TABLE 9
VOWEL /a/ FOR A WORD WITH THE LETTER *kaf* IN THE SECOND SYLLABLE
AND LETTER *mim* IN THE THIRD SYLLABLE PRESENT TENSE

Past Tense		Present Tense
1- <i>bakima</i>	→	<i>jabkamu</i>
بَكِمَ	→	يَبْكُمُ

Two data points show that the letter *kaf* (ك) in the second syllable is read with the vowel /i/ in the present tense. The first data point involves Uvular one (U1) articulation as in the letter *ʕayn* (ع) in Past Tense *ʕa/ka/ma* that changes into the Present Tense *jaʕ/ki/mu*. The second data point involves Sonorant tongue tip (STT) articulation, namely the letter *raʔ* (ر) in Past Tense *ra/ka/ma* that changes to the Present Tense *jar/ki/mu*. The change in vowel in the Present Tense for the second syllable from the Past Tense is clarified in the following Table 10:

TABLE 10
VOWEL /i/ FOR THE LETTER *kaf* IN THE SECOND SYLLABLE AND LETTER *mim*
IN THIRD SYLLABLE PRESENT TENSE

Past Tense		Present Tense	Past Tense		Present Tense
1- <i>ʕakama</i>	→	<i>jaʕkamu</i>	2- <i>rakama</i>	→	<i>jarkimu</i>
عَكَمَ	→	يَعْكُمُ	رَكَمَ	→	يَرْكُمُ

Nine data points show that the letter *kaf* (ك) in the second syllable is read with the vowel /u/ in the Present Tense. The first data point involves Uvular one (U1) articulation as in the letter *ʕayn* (ع) in Past Tense *ʕa/ka/ma* that changes to the Present Tense *jaʕ/ku/mu*. The second data point involves Middle of tongue (MT) articulation as in the letter *ʕayn* (ع) in the Past Tense verb *ʕa/ka/ma* that changes into the Present Tense *jaʕ/ku/mu*. The third data point involves Coronal one (CR1) articulation as in the letter *dal* (د) in the Past Tense *da/ka/ma* that changes into the Present Tense *jad/ku/mu*.

The fourth, fifth, and sixth data points are related to Coronal two (CR2) articulation, namely the letter *sin* (س) in the Past Tense *sa/ka/ma* that changes into the Present Tense *jas/ku/mu*, the letter *zai* (ز) in the Past Tense *za/ka/ma* that changes into the Present Tense *jaz/ku/mu*, and letter *sʕad* (ص) in Past Tense *sʕa/ka/ma* that changes into the Present Tense *jasʕ/ku/mu*. The seventh and eighth data points involve the Sonorant tongue tip (STT) articulation, namely the letter *raʔ* (ر) in the Past Tense *ra/ka/ma* that changed to the present tense *jar/ku/mu* and the letter lam (ل) in Past Tense *la/ka/ma* that can change into the Present Tense *jāl/ku/mu*. The ninth data point involved Lip (L) articulation for the letter *baʔ* (ب) in Past Tense *ba/ka/ma* that changed to Present Tense *jab/ku/mu*. The change in a vowel in the present tense in the second syllable of the Past Tense is explained in the following Table 11:

TABLE 11
VOWEL /u/ FOR *kaf* IN SECOND SYLLABLE AND *mim* IN THIRD SYLLABLE PRESENT TENSE

Past Tense		Present Tense	Past Tense		Present Tense	Past Tense		Present Tense
1- <i>ʕakama</i>	→	<i>jaʕkumu</i>	2- <i>ʕakama</i>	→	<i>jaʕkumu</i>	3- <i>dakama</i>	→	<i>jadkumu</i>
عَكَمَ	→	يَعْكُمُ	عَكَمَ	→	يَعْكُمُ	دَكَمَ	→	يَدْكُمُ
4- <i>sakama</i>	→	<i>jaskumu</i>	5- <i>zakama</i>	→	<i>jazkumu</i>	6- <i>sʕakama</i>	→	<i>jasʕkumu</i>
سَكَمَ	→	يَسْكُمُ	زَكَمَ	→	يَزْكُمُ	صَكَمَ	→	يَصْكُمُ
7- <i>rakama</i>	→	<i>jarkumu</i>	8- <i>lakama</i>	→	<i>jalkumu</i>	9- <i>bakama</i>	→	<i>jabkumu</i>
رَكَمَ	→	يَرْكُمُ	لَكَمَ	→	يَلْكُمُ	بَكَمَ	→	يَبْكُمُ

From the findings in Tables 9, 10, and 11, three phonological rules can be proposed as pioneered by Chomsky and Halle (1968) and later revised by El-Wadi (2005), and refined by Isa (2019) as follows:

R7: [+ vowel] \longrightarrow /a/ / {U1} *kaf* __ *mim* [*faʕila* Past Tense form]

Rule seven (R7) shows that the letter *kaf* occupying the second syllable place will be read with vowel /a/ if the first syllable is constructed from Uvular one (U1) articulation, namely the letter *ʕayn* (ع) from Past Tense *faʕila* form.

R8: [+ vowel] \longrightarrow /i/ / {U1, STT} *kaf* __ *mim* [*faʕala* Past Tense form]

Rule eight (R8) shows that the letter *kaf* placed on the second syllable will take the vowel /i/ if the first syllable is constructed from Uvular one (U1) articulation namely the letter *ʕayn* (ع), and Sonorant tongue tip (STT) articulation, namely the letter *raʕ* (ر) from Past Tense *faʕala* form.

R9: [+ vowel] \longrightarrow /u/ / {U1, MT, L, CR1, CR2, STT} *kaf* __ *mim*

Rule nine (R9) says that the letter *kaf* placed on the second syllable will be read with the vowel /u/ if the first syllable was constructed from Uvular one (U1) articulation as in the letter *ʕayn* (ع), lip (L) articulation, namely letter *baʕ* (ب), Middle of tongue (MT) articulation as in letter *ʕin* (ش), Coronal one (CR1) articulation as in *dal* (د), Coronal two (CR2), as in letter *zai* (ز) and *sin* (س) and *sʕad* (ص), and Sonorant tongue tip (STT) articulation, namely the letters *raʕ* (ر) and *lam* (ل).

Based on Tables 9, 10, and 11, there are 12 data points related to the letter *kaf* (ك) in the second syllable and the letters from lip articulation in the third syllable. If the student reads text or finds active verbs in Present Tense constructed from the letter *kaf* (ك) on the second syllable and letter *mim* (م) for the third syllable, 9 data points (75%) show the letter *kaf* (ك) in the second syllable is read with vowel /u/ (*dʕammah*), two (2) data points (16.67%) are read with vowel /a/ (*fathah*), and only one (1) data point (8.3%) is read with vowel /i/ (*kasrah*) as explained in the following in Figure 5:

Second syllable (Velar (VR))	Third syllable (Lips (L))	Vowel /a/	Vowel /i/	Vowel /u/
<i>kaf</i> (ك)	<i>mim</i> (م)	1	2	9

Figure 5. Frequency Distribution for Vowels Involving the Letter *kaf* in the Second Syllable and *mim* (م) in the Third Syllable.

From the findings shown in Figures 3, 4, and 5, it is clear that letters arising from velar articulation are most often read with vowel /u/, corresponding to 23 data points (57.5%), followed by 11 data points (27.5%) for vowel /a/, and only 6 data points (15%) for vowel /i/ if the third syllable is built from letter *mim* (م), as explained in the following in Figure 6:

Second syllable (Velar (VR))	Third syllable (Lips (L))	Vowel /a/	Vowel /i/	Vowel /u/
<i>dʕim</i> (ع)	<i>mim</i> (م)	4	2	8
<i>qaf</i> (ق)	<i>mim</i> (م)	6	2	6
<i>kaf</i> (ك)	<i>mim</i> (م)	1	2	9

Figure 6. Frequency Distribution of Vowels Involving Velar Articulation for the Second Syllable and the Letter *mim* (م) for the Third Syllable

VI. CONCLUSION

The arrangement of articulation that builds each three-syllable verb in the Arabic language will influence the vowel in the second syllable of the Present Tense verb, whether it takes the vowel /a/, /i/, or /u/. This proves that the opinion saying the vowels are random and only follow the speakers of the past (Al-Hilwani, 2008) and Yusuf (2019) is not definitive and can still be researched. This is because there exist patterns or certain rules for every verb made up of letters from articulations that produce different vowels, as aligned with the findings by Ibn Jinni (2000), El-Wadi (2005), Dollah and Azlina (2014), Yusuf et al. (2015), and Bu'nani (2011) who found that verbs constructed from epiglottis articulation on the second and third syllables will produce vowel /a/ in the second syllable of the Present Tense verb.

The phonological approach by Chomsky and Halle (1968) as revised by El-Wadi (2005) and refined by Isa (2019) can produce phonological rules that can tease out the construction of vowels for the second syllable in Arabic Present Tense verbs and offer an alternative for producing vowels based on the arrangement of articulation found in three-syllable verbs. What is important is that further research on features must be carried out using phonological approaches and these might be able to resolve the problematic issue of vowel assignment that puzzles learners of the Arabic language.

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