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Dedication

It is our pleasure and great privilege to present the thirty-second issue of the Academic Journal of Research and Scientific Publishing to all researchers and doctors who published their research in the issue, and we thanks and appreciate to all contributors and supporters of the academic journal and those involved in the production of this scientific knowledge edifice.

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A Template-Based Approach for Tagging Non-Vocalized Arabic Nouns

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Abstract:

There exist no corpora of Arabic nouns. Furthermore, in any Arabic text, nouns can be found in different forms. In fact, by tagging nouns in an Arabic text, the beginning of each sentence can determine whether it starts with a noun or a verb.

Part of Speech Tagging (**POS**) is the task of labeling each word in a sentence with its appropriate category, which is called a **Tag** (*Noun, Verb and Article*). In this thesis, we attempt to tag non-vocalized Arabic text. The proposed POS Tagger for Arabic Text is based on searching for each word of the text in our lists of Verbs and Articles. Nouns are found by eliminating Verbs and Articles. Our hypothesis states that, if the word in the text is not found in our lists, then it is a Noun. These comparisons will be made for each of the words in the text until all of them have been tagged.

To apply our method, we have prepared a list of articles and verbs in the Arabic language with a total of 112 million verbs and articles combined, which are used in our comparisons to prove our hypothesis.

To evaluate our proposed method, we used pre-tagged words from "*The Quranic Arabic Corpus*", making a total of 78,245 words, with our method, the Template-based tagging approach compared with (AraMorph) a rule-based tagging approach and the Stanford Log-linear Part-Of-Speech Tagger.

Finally, AraMorph produced 40% correctly-tagged words and Stanford Log-linear Part-Of-Speech Tagger produced 68% correctly-tagged words, while our method produced 68,501 correctly-tagged words (88%).

Keywords: Template, Approach, Tagging, Non-Vocalized, Arabic Nouns.

1. Introduction

Arabic texts can be either: **Vocalized** (*The Holy Quran*) or **Non-Vocalized** (*newspapers, books, and the media*). Handling non-vocalized texts is confusing; due to the ambiguity problem, words may have more than one meaning. "كتب" (*this can be a noun "books" or a verb "to write"*).

There exist no corpora of Arabic nouns. Furthermore, in any Arabic text, nouns can be found in different forms and can refer to non-Arabic items or things. In fact, by tagging nouns in an Arabic text, the beginning of each sentence can determine whether it starts with a noun or a verb.

In this chapter, we will discuss Word Templates, Natural Language Processing, and Part of Speech Tagging (**POS**), then we will state out objectives and the hypothesis used in this thesis, followed by an introduction to the Arabic words lists used in our approach. Finally, the structure of our thesis will be outlined.

1.1   What is a Word Template?

The term 'Word Template' is defined as any processing element that can be combined with a data model and processed by a template engine to produce a result (Ndie et al., 2010).

1.2 Natural Language Processing

Any language that is naturally used by humans (*Arabic and English*) is called Natural Language. In other words, a natural language is not an artificial or a man-made language, such as programming languages. Therefore, Natural language processing (NLP) is an area of research and application that explores how computers can be used to understand and manipulate natural language text or speech to do useful things(Chowdhury, 2003).

1.3 Part of Speech Tagging

Part of Speech Tagging (**POS**) is the task of labeling each word in a sentence with its appropriate category, which is called a **Tag** (*Noun, Verb and Article*) (AlGahtani et al., 2009). In this thesis, we attempt to tag non-vocalized Arabic text.

We intended to use a simplified tags set in our approach (*Noun, Verb and Article*) because our objective is to tag non-vocalized Arabic text, by applying a Template-based approach without explaining the construction of the Arabic sentence and also because most of the Arabic language is rooted to a verb, noun or article.

POS tagging is useful for a large number of applications. It is the first analysis step in many syntactic parsers; it is required for the correct lemmatization of words; and it is used in information extraction, vocalization, translation, speech synthesis, lexicographic research, term extraction, and many other applications.

1.4 Objectives

There are many methods of POS tagging which can be classified into three categories: the Statistical Approach, the Rule-Based Approach and the Hybrid Approach. All of these approaches are CPU consuming while our approach is memory consuming.

Since the 1980's, processor speed has increased by 1,000 times. Meanwhile, memory capacity has increased by 1,000,000 times.

It has been found that, since 2005, CPU speed has not followed the estimation of Moore's law. In fact, due to the thermal wall – *as he described it* – CPU speed has reached a certain limit(Benson, 2014).

In Figure 1, you can see that transistor density has continued to climb according to Moore's Law. However, power consumption and CPU have reached a certain limit.
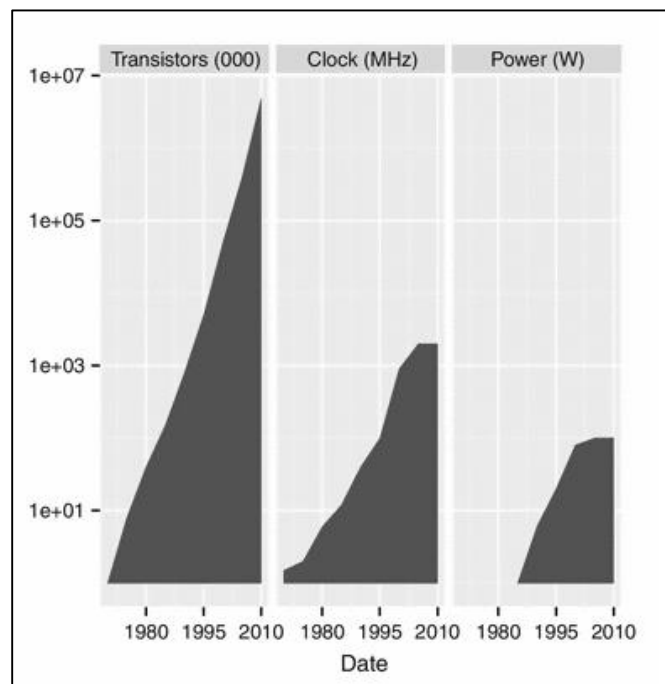
Figure 1: Transistor, clock, and power in Intel CPUs over time.

Meanwhile, the physical memory capacity is still growing; for example, Windows 7 64-bit memory limit is up to 192 GB.

Version	Limit on X86	Limit on X64
Windows 7 Ultimate	4 GB	192 GB
Windows 7 Enterprise	4 GB	192 GB
Windows 7 Professional	4 GB	192 GB

Figure 2: This table specifies the limits on physical memory for Windows 7

For the above, using a memory consuming approach is more appropriate than a CPU consuming one.

1.5 Our Hypothesis

The proposed POS Tagger for Arabic Text is based on searching for each word of the text in our lists of Verbs and Articles. Nouns are found by eliminating Verbs and Articles.

For example, a simple sentence like (حضر زيد إلى المدرسة) can be tagged by comparing the first word (حضر) with our Articles list. The word will be tagged "*Article*" if it is found. Otherwise, the same word will be compared with the Verb list.

The word will be tagged "*Verb*" if it was found. Otherwise, by default, the word will be tagged "*Noun*". Our hypothesis states that, if the word in the text is not found in our lists, then it is a Noun. These comparisons will be made for each of the words in the text until all of them have been tagged.

This approach can be applied to Arabic language because it has static verb derivations and a limited number of words.

1.6 Arabic Verbs and Articles Lists

To apply our method, we must first prepare a list of articles and verbs in the Arabic language. Unfortunately, we only have a list of three-lettered verbs (*over 28 million verbs*) produced as text files by the Arabic Language Template Grammars Component Based Technology (Ba-Aziz, 2009).

Four-lettered verbs (*about 2,000 verbs*) and articles (*over 4,000 articles*) of the Arabic language have not been employed before. All of our data, both new and old, must be prepared for our method, and we must add the proper prefix to the whole data.

The result was a total of 112 million verbs and articles combined, which are used in our comparisons to prove our hypothesis.

As will be discussed in sections 2.2.4 and 2.2.5, using a program that we have developed, a list of all four-lettered verbs and articles will be produced.

1.7 Thesis Layout

The next chapter, Chapter Two, "*Literature Review*," will provide a brief yet better understanding of the Arabic language, together with its rich and complex morphology, and also survey some of the similar work previously performed on the application of POS tagging approaches to Arabic.

In Chapter Three, "*Methodology*," we will discuss the methodology we applied to prove our thesis, and also provide the necessary methodology to design the system as well as analyze its different categories. The implementation of our model will be presented along with the evaluation method that will be used to test the proposed model fully.

Finally, in Chapter Four, "*Results and Conclusions*," a full test of the proposed model will be conducted and a comparison with the two other systems will be undertaken. Finally, a conclusion of the results at hand will be presented.

2. Literature Review

2.1 Introduction

POS tagging is one of the most important natural language problems studied by researchers. The significance of POS tagging for language processing is the large amount of information it provides about a word and its neighbors (Jurafsky & Martin, 2000).

POS tagging is the process of assigning a part-of-speech or other syntactic class marker to each word in the corpus (Jurafsky & Martin, 2000). It is, in other words, the process of assigning a tag from a limited set of tags (*Tag Set*) to a word. The number of tags in a tag set depends on both the language and the intended application. If we talk about tagging, then we always mean some tag set, perhaps implicitly.

There are many methods associated with POS tagging. Most of the modern methods use some form of machine learning.

In this chapter, we will present an introduction to Arabic Language and Arabic Morphology, then outline the POS tagging approaches used for Arabic.

2.2   The Arabic Language

Arabic is ranked sixth in the world's league table of languages. With 22 countries defining Arabic as their official language, it has an estimated 186 million native speakers and is spoken by at least 250 million people. As the language of the Quran, the holy book of Islam, it is also widely used throughout the Muslim world. The Arabic language belongs to the Semitic group of languages, which also includes Hebrew and Amharic, the main language of Ethiopia.

Arabic is one of the few languages that exhibits diglossia, which is the separation between the spoken language (*dialects*) and the formal language. However, the formal language is Modern Standard Arabic (**MSA**), which is used in written texts and spoken in formal settings (Zughoul & Abu-Alshaar, 2005).

Arabic is written using the Arabic alphabet, from right to left, and there are no capital letters. Arabic has two genders: masculine and feminine.

Arabic letters are linked together to form words, so some letters may change shape according to their location in the word.

There are 29 letters in the Arabic language, with seven letter sounds that do not exist in the English language (ح،خ،ص،ض،ط،ع،غ). Arabic uses vocalized symbols to determine the sound of a word, and these symbols may or may not be written down, resulting in a very high level of ambiguity.

In addition to the singular and plural constructs, Arabic has an added form called the "*dual*", which indicates precisely two of something. Arabic has only three verb tenses: the past, the present, and the imperative.

2.2.1 Arabic Morphology

Morphology is concerned with the structure of words. It is almost inconceivable for a natural language application not to employ morphological knowledge (Wintner, 2004).

Like any other Semitic language, Arabic is highly inflected. Based on what is normally called a "*Constant Root System*", words are derived from a root and pattern, combined with prefixes, suffixes, and circumfixes.

The root, which contains the seed meaning of the word, consists of 3-4 constants, that are called radicals, and the pattern or a "*template*" is a sequence of variables. Patterns are simply all of the different variations of prefixes, infixes, and suffixes that can be allocated to any given root.

Arabic compound words are created by assigning the root radicals to the pattern variables. The combinations of the same root with a different pattern may result in a different meaning.

Sometimes, prefixes and/or suffixes are attached to words. Those affixes may modify several features of the word, including its number (*singular, dual, plural or collective*), gender (*masculine, feminine or no gender*), possession, definiteness, case (*nominative, accusative, or genitive*), tense (*past, present, and future*) and more. Arabic affixes have the feature of concatenating with each other according to predefined linguistic rules, which increases the overall number of affixes (Al-Sughaiyer & Al-Kharashi, 2004).

2.2.2 Arabic Vowel Marks

In Arabic, there are three kinds of vowels:

- The three vowel letters, which are (ا), (و) and (ي). These are used for long vowels.
- The "Hamza".
- The vowel marks which are used to denote short vowels.

To distinguish short vowels from long ones when words are read, Arabic script uses vowel marks. This is implemented by writing the marks over or under a letter.

In modern day Arabic text, these marks are usually not written because Arabic readers can always guess them. Therefore, in our approach, we will consider a tagging system for non-vocalized Arabic text (*a text with no vowel marks*).

2.2.3   Arabic as a Templatic Language

Perhaps the most interesting aspect of Arabic is its regularity of form. Arabic morphemes "*words*" generally derive from three root radicals to which various affixes (*prefixes, suffixes, and infixes*) can be attached to create a word (Seikaly, 2207).

2.2.4   Four-Lettered Verb List

As will be described later in Figure 3, a verb is divided into two main types: complete (تام), as in (عسكر), and deficient (معتل), as in (وسوس).

A complete verb, as in (عسكر), is again divided into two types: intransitive (لازم), as in (بعثر), and transitive (متعد), as in (تزلزل).

A transitive verb, as in (تزلزل), is divided into two types: passive (مبني للمجهول) and active (مبني للمعلوم).
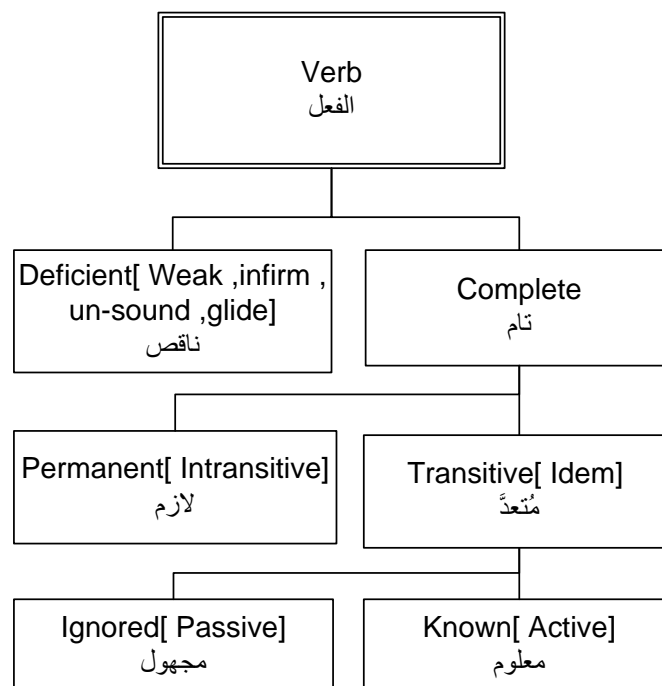
Figure 3: Arabic Verbs

All these types must be considered in order to create a complete list of four-lettered Arabic verbs. Figure 4 describes the morphology rules used to generate all Arabic verbs.

			Personal Pronoun		
		Number	غائب 3rd	مخاطب 2nd	متكلم 1st
Masculine	مُذكَّر Male	Singular مفرد	هو	أنت	أنا
		Dual مثنى	هما	أنتما	نحن
		Plural جمع	هم	أنتم	نحن
	مؤنث Feminine	Singular مفرد	هي	أنتِ	أنا
		Dual مثنى	هما	أنتما	نحن
		Plural جمع	هن	أنتن	نحن

Figure 4: Morphology rule attributes for Arabic verbs

For example, or the four-lettered Arabic verb derivation, we considered the verb (عسكر). As shown in Figure 5, a complete derivation of the verb (عسكر) was presented.

	الماضي	المضارع	المضارع المجزوم	المضارع المنصوب	المضارع المؤكد	الأمر	الأمر المؤكد
أنت	عسكرت	تعسكر	تعسكر	تعسكر	تعسكرن	عسكر	عسكرن
أنت	عسكرت	تعسكرين	تعسكري	تعسكري	تعسكرن	عسكري	عسكرن
أنتما	عسكرتما	تعسكران	تعسكرا	تعسكرا	تعسكران	عسكرا	عسكران
أنتم	عسكرتم	تعسكرون	تعسكروا	تعسكروا	تعسكرن	عسكروا	عسكرن
أنتن	عسكرتن	تعسكرن	تعسكرن	تعسكرن	تعسكرنان	عسكرن	عسكرنان
أنا	عسكرت	أعسكر	أعسكر	أعسكر	أعسكرن		
نحن	عسكرنا	نعسكر	نعسكر	نعسكر	نعسكرن		
هو	عسكر	يعسكر	يعسكر	يعسكر	يعسكرن		
هي	عسكرت	تعسكر	تعسكر	تعسكر	تعسكرن		
هما	عسكرا	يعسكران	يعسكرا	يعسكرا	يعسكران		
هم	عسكروا	يعسكرون	يعسكروا	يعسكروا	يعسكرن		
هن	عسكرن	يعسكرن	يعسكرن	يعسكرن	يعسكرنان		

Figure 5: An example of a four-lettered Arabic verb derivation.

In our approach, which is based on comparisons, all of the verbs and articles in the Arabic text must be denoted in our lists in order to define Nouns by elimination. Therefore, it is necessary to add the proper prefix and suffix. Many of the prefixes and suffixes are generated within derivations of verbs and articles. However, we have added the missing prefixes as shown in the figure below.

```
for line in infile:
    if len(line)>2:
        outfile.write(line + u'\r\n')
        outfile.write(u"و" + line + u'\r\n')
        outfile.write(u"ف" + line + u'\r\n')
        outfile.write(u"ل" + line + u'\r\n')
        outfile.write(u"س" + line + u'\r\n')
    else:
        outfile.write(line)
```

Figure 6: The function used to add prefixes to Verbs and Articles.

Naturally, since we are focusing on tagging non-vocalized Arabic text, many derivations of the same verb will be duplicated.

Therefore, we will have a redundancy problem. In Figure 5, after extensive revision, it is clear that most of the verb (عسكر) derivations are the same. Deleting these duplicates is mandatory.

```
def del_dups(seq):
    seen = {}
    pos = 0
    for item in seq:
        if item not in seen:
            seen[item] = True
            seq[pos] = item
            pos += 1
    del seq[pos:]
```

Figure 7: The function employed to delete duplication.

Finally, by using a program that we developed, we found and listed the total of over 2,000 four-lettered Arabic verbs, with all of their unique derivations.

2.2.5 Articles List

In Arabic language, there are about 80 articles, known as: (حروف المعاني) (Wright & Caspari, 2011).

الضمير	أنتَ	أنتما	أنتم	أنتِ	أنتن	هو	هما	هم	هي	هن	أنا	نحن
آي	آيك	آيكما	آيكم	آيك	آيكن	آيه	آيهما	آيهم	آيها	آيهن	آيي	آينا
إلي	إليك	إليكما	إليكم	إليك	إليكن	إليه	إليهما	إليهم	إليها	إليهن	إلي	إلينا
أن	أنك	أنكما	أنكم	أنك	أنكن	أنه	أنهما	أنهم	أنها	أنهن	أني	أننا
إن	إنك	إنكما	إنكم	إنك	إنكن	إنه	إنهما	إنهم	إنها	إنهن	إني	إننا
أي	أيك	أيكما	أيكم	أيك	أيكن	أيه	أيهما	أيهم	أيها	أيهن	أيي	أينا

Figure 8: An example of Arabic articles derivation.

Applying the morphology rules used to generate all Arabic verbs to all Arabic articles using a program that we have developed, keeping in mind the redundancy problem, we managed to list a total of over 3,000 articles with all of their unique derivations.

2.3   POS Tagging Approaches used for Arabic

2.3.1   SVM

Diab (Diab et al., 2004), (Diab, 2009) applied a Support Vector Machine (**SVM**) to Arabic POS tagging and tokenization.

The SVM-POS tagger achieved an accuracy level of 95.49%. The Arabic TreeBank, consisting of 4,519 sentences, was used for the training and testing. It employs the LDC's POS tagset, which consists of 24 tags35.

2.3.2   SVM + Morphological Analyzer

In Habash (Habash & Rambow, 2005), a Support Vector Machine (**SVM**) was applied with the support of a morphological analyzer to produce all possible analyses. Their POS evaluation shows an accuracy of 97.6% on ATB1 and an accuracy of 95.7% on ATB2, both of which are based on gold standard tokenization.

2.3.3   Statistical and Rule-based

In Khoja (Khoja, 2001), a system is developed, using a combination of both statistical and rule-based techniques. It uses a simple tagset.

A corpus of 50,000 Modern Standard Arabic words (*an extract from the Saudi Al-Jazirah newspaper, dated 03/03/1999*) was tagged using this tagset 36. It achieved an accuracy of around 90%.

2.3.4   Stanford PoS Tagger

This was originally developed for use with English language at Stanford University. The tagger is based on the maximum entropy model. The improved version, which was published in 2003, adds support for other languages together with speed and usability improvements.

The latest version comes with trained models for Chinese, German and Arabic. It claims to have a 96.42% accuracy for Arabic. The tagger was trained using the training component of the Arabic Penn Treebank (ATB). It uses augmented Bies mapping of ATB tags (Toutanova et al., 2003).

2.3.5   Hidden Markov Model (HMM)

In Al Shamsi (Al Shamsi & Guessoum, 2006), the proposed Hidden Markov Model (HMM) POS tagger has been tested and achieved a performance of 97%. It used a very simple POS tag set of 55 tags. The training was performed on a special small corpus consisting of a 9.15 MB corpus of native Arabic articles. The authors used a stemmer for segmenting and separating affixes from the stem to produce prefix, stem, and suffix parts.

2.3.6   Brill (Transformation) + Morphological Analyzer

In AlGahtani (Ndie et al., 2010), transformation-based learning was used, as implemented in the Brill tagger (Brill, 1995), for POS tagging of Arabic, with segment-based tags.

They used the Buckwalter morphological analyzer (Buckwalter, 2002), and their approach was evaluated on the whole ATB as well as on ATB1. For ATB1, they achieved a POS tagging accuracy of 96.9%.

Using the whole ATB, the accuracy was 96.1%, even though large parts of the Treebank are duplicated, so that it is likely that parts of their test set were actually present in the training set (Ndie et al., 2010).

2.3.7 Rules-based and Memory-based

In Tlili-Guiassa (Tlili-Guiassa, 2006), a hybrid of rule-based and memory-based learning methods was used. Their method is based firstly on rules that are automatically learned from the training corpus (*that consider the post-position, ending of a word and patterns*) and then the anomalies were corrected by adopting a Memory-Based Learning Method (**MBL**). Secondly, by checking the exceptions to the rules, more information was made available to the learner for treating these exceptional cases. The accuracy level was 85%. The tag set was derived from that of Khoja (Khoja, 2001).

2.3.8 Statistical

In Mohamed (Mohamed & Kübler, 2010), two approaches were used. Their first approach used complex tags that described full words and did not require any word segmentation. The second approach was segmentation-based, using a segment based on machine learning. They showed that word-based POS tagging can yield better results than segment-based tagging (*93.93% vs. 93.41%*). Combining both methods resulted in a word accuracy of 94.37%. The POS tag set of the Penn Arabic Treebank was used and two sections of the ATB (**P1V3** and **P3V1**), since those two sets do not contain duplicate sentences. This data set contained approximately 500,000 words.

2.3.9 AraMorph

The Buckwalter Arabic morphological analyzer is one of the best-known Arabic morphological analysis and POS tagging systems. It was developed by LCD (*Linguistic Data Consortium*) in both Perl and Java.

The components of the Buckwalter Arabic Morphological Analyzer are the morphology analysis algorithm, and the data,

that primarily consist of three Arabic/English lexicon files: **dictPrefixes** contains 299 entries, **dictSuffixes** contains 618 entries, and **dictStems** contains 82,158 entries, representing 38,600 lemmas.

These lexicons are supplemented by three morphological compatibility tables that are used to control the **prefix-stem** combinations (*1,648 entries*), **stemsuffix** combinations (*1,285 entries*), and **prefix-suffix** combinations (*598 entries*). The algorithm of the morphology analysis and POS tagging is imbedded in the code. It uses the three lexicon files and three compatibility tables in order to perform the morphological analysis and tagging of Arabic words (Buckwalter, 2002).

3. Methodology

3.1 Introduction

Any linguistic or literary investigation of texts can benefit from computational technology. Evidently, the use of computational dictionaries, concordances and indexes, augmented by sophisticated search tools, can be extremely useful for scholars who are interested in such investigations. As a first step toward achieving this goal, we must first find a much faster and reliable system that can tag any non-vocalized Arabic text.

In this chapter, we will discuss the methodology that we applied to prove our thesis. As stated before (*in chapter one*), the proposed POS Tagger for Arabic Text is based on searching for each word in a text in our lists of Verbs and Articles. Nouns are tagged through the elimination of Verbs and Articles.

Our methodology can be described as a template-based tagging system, because every derivation of the Arabic words is produced from a template. For example, a simple sentence like (حضر زيد إلى المدرسة) can be tagged by comparing the first word (حضر) with our Articles list, which contains every Arabic article and all of their template derivations.

The word will be tagged "*Article*" if it is found. Otherwise, the same word will be compared with the Verb list, which contains every Arabic verb and all of their template derivations. The word will be tagged "*Verb*" if it is found. Otherwise, the word will be, by default, tagged as "*Noun*". These comparisons will be made for every word until they have all been tagged.

مكة	إلى	زيد	حضر
Noun	**Article**	**Noun**	**Verb**

Figure 9: An example of tagging an Arabic sentence.

3.2   Verbs and Articles Lists

To apply our method, as discussed in section 1.6, we must first prepare a list of the articles and verbs of the Arabic language. The comparisons that we will make to tag a non-vocalized Arabic text must relate to whole words (includindg the *prefix, infix* and *suffix*).

Many of the prefixes and suffixes in our verbs and articles lists are generated within the derivations of the verbs and articles. However, we have added the missing prefixes through a program to each and every Verb and Article.

3.3   The Design

A methodological approach to building the model design is required in order to continue.

The methodology for this design is based on a database of Arabic verbs and articles, internal buffers, a comparison algorithm, and a raw, non-vocalized Arabic text.

First, the verbs and articles must be uploaded, and then both the Arabic verbs as well as the Arabic articles must be arranged into arrays according to their length. When the arrangement has been completed, each word of the raw, non-vocalized Arabic text is compared with both Articles and Verbs arrays to produce the resulting tagged text.

The proposed model includes the following steps:

Step-1 Uploading Articles and Verbs:

In this step, the proposed design reads the database of Articles and Verbs and stores them in the buffer. According to the length of each Article and Verb, the system will store them into arrays. For example, the verb "حضر" will be stored in the three-lettered array. (*See Figure 10*)

Less Than Two Letters	16
Two Letters	2,190
Three Letters	42,466
Four Letters	447,101
Five Letters	2,075,181
Six Letters	5,700,889
Seven Letters	12,166,765
Eight Letters	19,839,791
Nine Letters	24,240,970
Ten Letters	22,405,515
Eleven Letters	15,291,729
More Than Eleven Letters	10,360,471
Total	**112,573,084**

Figure 10: The arrays used in the buffer and the total number of elements.

Step-2 Uploading the Raw Text File:

At this point, the proposed design reads the raw, non-vocalized Arabic text file word by word and stores them in the buffer. Then, the system will identify the length of each raw word.

Step-3 Comparison Algorithm:

In this step, using a binary search algorithm, according to the length of each non-vocalized raw word, the system will compare it with the proper length array of the Articles. If a match is found, the raw, non-vocalized Arabic word will be tagged "*Article*".

Otherwise, the system will compare it with the proper length array of Verbs. If the raw word is found, it will be tagged "*Verb*".

Step-4 Tagging Nouns:

By default, if the system does not find the word from the raw Arabic text in either the Verbs and Articles lists, it will be tagged "*Noun*".

These steps are repeated as a cycle for each word in the raw Arabic text file. In Figure 11, the proposed system is shown with all of its components, followed by a complete notation of each component.
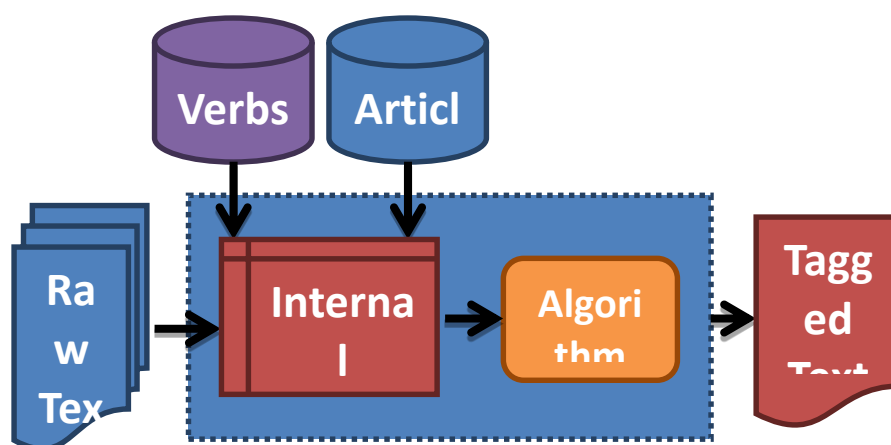

Figure 11: Our proposed approach: the Template-Based Approach to POS Tagging

Raw Text: A non-vocalized, traditional Arabic text that can be found, for example, in newspapers, books and on Arabic websites.

Verbs List: A list of all Arabic verbs and all of their derivations that we have developed by combining three-lettered verbs (*from Ba-Aziz* (Ba-Aziz, 2009)) with the four-lettered verbs that we have found.

Articles List:	A list of all of the Arabic articles and all of their derivations that we have found and developed.
Internal Buffer:	Different variables (*or arrays*) that are used to contain the uploaded lists of verbs and articles, which are used to compare the data according to the length of the words.
Algorithm:	A binary search searches sorted lists using a divide and conquer technique. On each iteration, the search domain is halved, until the result is found. Since our Verbs and Articles lists are sorted, using a binary search algorithm is the optimal choice.
Tagged Text:	The result of the proposed model. Each word of the input is tagged with one of the following tags: *Article, Verb or Noun*.

3.4   Implementation

The model will be built based on the requirements mentioned in the previous sections. That will include building a program based on the initial analysis. In the initial phases of the research, it was hoped that an existing Arabic three-lettered verbs list would be available. The verbs list was provided as a text file by the Arabic Language Template grammars' component-based technology (Ba-Aziz, 2009).

The four-lettered verbs (*about 2,000 verbs*) and the articles (*over 4,000 articles*) of the Arabic language have never been handled before. All of our data, both new and old, must be prepared for our method; we must add the proper prefixes to the whole data.

The result produced a total of over 112 million verbs and articles, which are used in our comparisons to prove our hypothesis.

3.4.1   Model Setup

The model was built using Python 3.4 language, involving the 64-bit version, on a Windows 7 64-bit platform using an Intel i7 processor with 16G bytes of memory. The system programming consisted of over 800 lines with over 10 functions.

3.4.2 Uploading the Articles and Verbs

To upload Articles and Verbs according to their length, the program first removed any duplications then sorted and stored them into arrays.

```python
for item in newWordLine:
    if len(item)<2: lessArray.append(item+'\n')
    elif len(item)==2: twoArray.append(item+'\n')
    elif len(item)==3: threeArray.append(item+'\n')
    elif len(item)==4: fourArray.append(item+'\n')
    elif len(item)==5: fiveArray.append(item+'\n')
    elif len(item)==6: sixArray.append(item+'\n')
    elif len(item)==7: sevenArray.append(item+'\n')
    elif len(item)==8: eightArray.append(item+'\n')
    elif len(item)==9: nineArray.append(item+'\n')
    elif len(item)==10: tenArray.append(item+'\n')
    elif len(item)==11: elevenArray.append(item+'\n')
    elif len(item)>11: moreArray.append(item+'\n')
lessArray = del_dups(lessArray)
lessArray = sort_array(lessArray)
outfile = codecs.open("lessArray-I" + ".txt", encoding="utf-8" ,mode='w')
for word in lessArray:
    outfile.write(word)
outfile.close()
lessArray=[]
print ("Done lessArray file..")

twoArray = del_dups(twoArray)
twoArray = sort_array(twoArray)
outfile = codecs.open("twoArray-I" + ".txt", encoding="utf-8" ,mode='w')
for word in twoArray:
    outfile.write(word)
outfile.close()
twoArray=[]
print ("Done twoArray file..")
```

Figure 12: Reading the Verbs and Articles files and then removing any duplications, before sorting and storing them according to length.

3.4.3 Uploading the Raw Text File

The program now reads the raw, non-vocalized Arabic text file, word by word, and stores them in the buffer.

```
filename = "D:\Test\Quran.txt"
if filename != '':
        f1 = open(filename,'r')
        strfiletext = f1.read()
        f1.close()
```

Figure 13: Uploading the raw text file.

3.4.4 Comparison Algorithm

According to the length of each non-vocalized raw word, the program will compare it using a binary search algorithm with the proper length array of Articles and Verbs.

```
def binary_search(a, x):

    i = bisect_left(a, x)
    if i != len(a) and a[i] == x:
        return i
    #raise ValueError
    return -1
with codecs.open('Result-Report-Quran.txt', encoding='utf-8',mode='w') as outfile:
    for item in strQuran:
        if binary_search(strOrderedParticles,item)>=0:
            numArticle+=1
            outfile.write("The word ("+item+")\tFound as ARTICLE\r\n")
        elif len(item)<2 and binary_search(lessArray,item)>=0:
            numVerb+=1
            outfile.write("The word ("+item+")\tFound As VERB in lessArray \r\n")
        elif len(item)==2 and binary_search(twoArray,item)>=0:
            numVerb+=1
            outfile.write("The word ("+item+")\tFound As VERB in twoArray \r\n")
        elif len(item)==3 and binary_search(threeArray,item)>=0:
            numVerb+=1
            outfile.write("The word ("+item+")\tFound As VERB in threeArray \r\n")
        elif len(item)==4 and binary_search(fourArray,item)>=0:
            numVerb+=1
            outfile.write("The word ("+item+")\tFound As VERB in fourArray \r\n")
        elif len(item)==5 and binary_search(fiveArray,item)>=0:
```

Figure 14: Comparison Algorithm.

3.4.5 Tagging Nouns

By default, if the program did not find the word from the raw Arabic text in either the Verbs or Articles lists, it will be tagged "*Noun*".

```
elif len(item)==9 and binary_search(nineArray,item)>=0:
    numVerb+=1
    outfile.write("The word ("+item+")\tFound As VERB in nineArray \r\n")
elif len(item)==10 and binary_search(tenArray,item)>=0:
    numVerb+=1
    outfile.write("The word ("+item+")\tFound As VERB in tenArray \r\n")
elif len(item)==11 and binary_search(elevenArray,item)>=0:
    numVerb+=1
    outfile.write("The word ("+item+")\tFound As VERB in elevenArray \r\n")
elif len(item)>11 and binary_search(moreArray,item)>=0:
    numVerb+=1
    outfile.write("The word ("+item+")\tFound As VERB in moreArray \r\n")
else:
    numNoun+=1
    outfile.write("The word ("+item+")\tFound As NOUN\r\n")
```

Figure 15: Tagging nouns by default.

Figure 16: Part of the result.

3.4.6   Python 3.4

Python is a powerful computer language that is used in a variety of applications. It emphasizes code readability, a huge standard library and, above all, it is open source. Using Python 3.4 enabled us to benefit from deploying readymade components' features.

3.5   Evaluation methods

There exist different ways of evaluating a tagger; among the most common are the accuracy or success rate.

$$Success\ rate = \frac{Correctly\ tagged\ tokens}{Total\ number\ of\ tokens} \times 100$$

The success rate is defined over all tags and evaluated by comparing the tags assigned by a tagger with each word assigned to its best tag.

4.   Results and Conclusions

4.1   Introduction

In this chapter, we will discuss the results of our research, and the fulfillment of our objectives.

To evaluate our proposed method, we used pre-tagged words from "The Quranic Arabic Corpus", making a total of 78,245 words (Dukes, 2009), with our method, the Template-based tagging approach compared with (AraMorph) a rule-based tagging approach (Buckwalter, 2002) and the Stanford Log-linear Part-Of-Speech Tagger (Toutanova et al., 2003).

Human Tagged		AraMorph		Correctnes	Stanford		Correctnes	Our Method		Correctnes
الم	N	الم	V	0	الم	V	0	الم	N	1
ذلك	A	ذلك	U	U	ذلك	A	1	ذلك	N	0
الكتاب	N	الكتاب	U	U	الكتاب	N	1	الكتاب	N	1
لا	A	لا	U	U	لا	A	1	لا	A	1
ريب	N	ريب	N	1	ريب	N	1	ريب	N	1
فيه	A	فيه	A	1	فيه	N	0	فيه	A	1
هدى	N	هدى	V	0	هدى	N	1	هدى	V	0
للمتقين	N	للمتقين	A	0	للمتقين	N	1	للمتقين	N	1
الذين	A	الذين	U	U	الذين	A	1	الذين	A	1
يؤمنون	V	يؤمنون	U	U	يؤمنون	V	1	يؤمنون	V	1
بالغيب	N	بالغيب	A	0	بالغيب	N	1	بالغيب	N	1
ويقيمون	V	ويقيمون	U	U	ويقيمون	N	0	ويقيمون	V	1
الصلاة	N	الصلاة	U	U	الصلاة	N	1	الصلاة	N	1
ومما	A	ومما	U	U	ومما	N	0	ومما	N	0
رزقناهم	V	رزقناهم	V	1	رزقناهم	N	0	رزقناهم	N	0
ينفقون	V	ينفقون	U	U	ينفقون	V	1	ينفقون	V	1
والذين	A	والذين	U	U	والذين	N	0	والذين	A	1
يؤمنون	V	يؤمنون	U	U	يؤمنون	V	1	يؤمنون	V	1

Figure 17: Part of the results.

4.2   AraMorph

The Buckwalter Arabic morphological analyzer is one of the best-known Arabic morphological analysis and POS tagging systems. It was developed by LCD (*Linguistic Data Consortium*) in both Perl and Java.

The components of the Buckwalter Arabic Morphological Analyzer are the morphology analysis algorithm and the data, that primarily consist of three Arabic/English lexicon files: **dictPrefixes** contains 299 entries, **dictSuffixes** contains 618 entries, and **dictStems** contains 82,158 entries, representing 38,600 lemmas. These lexicons are supplemented by three morphological compatibility tables that are used to control **prefix-stem** combinations (1,648 entries), **stemsuffix** combinations (1,285 entries), and **prefix-suffix** combinations (598 entries). The algorithm for the morphology analysis and POS tagging is imbedded in the code. It uses the three lexicon files and the three compatibility tables in order to perform morphological analysis and the tagging of Arabic words (Buckwalter, 2002).
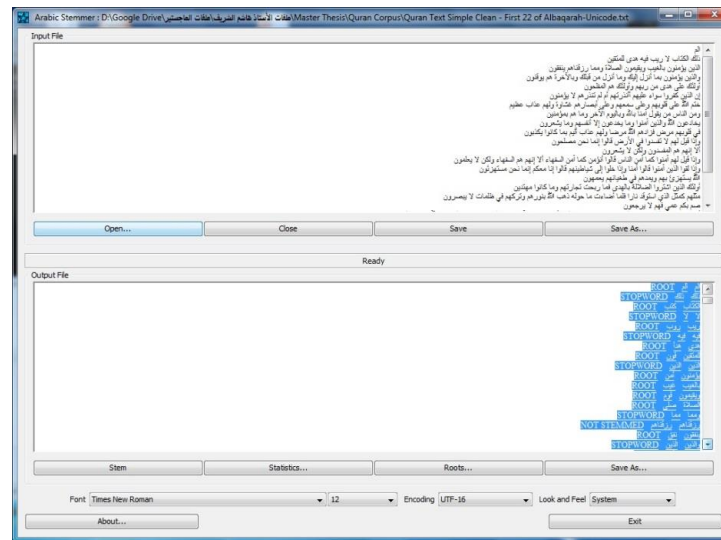
Figure 18: Screenshot of the AraMorph system

4.3 The Stanford POS Tagger

The Stanford part-of-speech tagger uses both preceding and following tag contexts via a dependency network representation, lexical features, including jointly conditioning multiple consecutive words, the effective use of priors in conditional log linear models, and the fine-grained modeling of unknown word features. By combining these ideas, the tagger gives a 97.24% accuracy level on the **Penn Treebank WSJ**, an error reduction of 4.4% on the best previous single automatically learned tagging result (Toutanova et al., 2003).
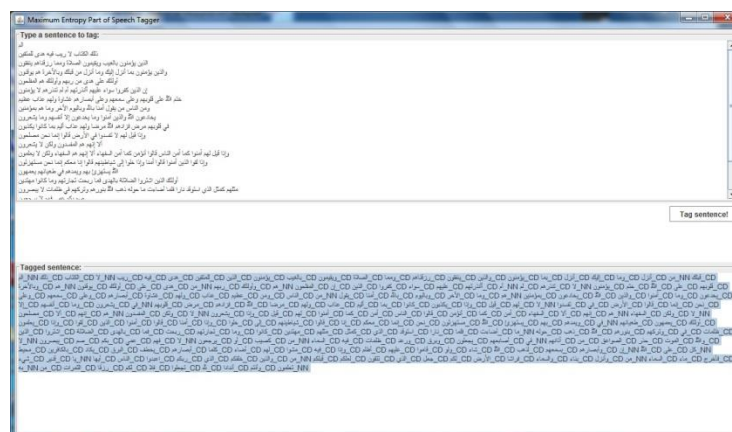

Figure 19: Screenshot of the Stanford system

4.4 The Quranic Arabic Corpus

The Quranic Arabic Corpus is an online, annotated linguistic resource with multiple layers of annotation, including morphological segmentation, part-of-speech tagging, syntactic analysis using dependency grammar and a semantic ontology (Dukes, 2009).
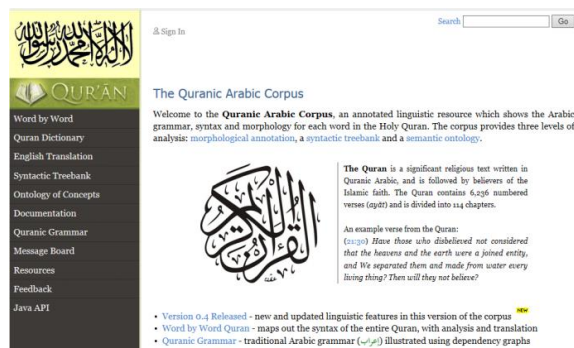

Figure 20: Screenshot of the Quranic Arabic Corpus website

4.5 Results

The AraMorph results produced 14% wrongly-tagged words and Stanford produced 32% wrongly-tagged words, while our method produced only 12% wrongly-tagged words out of all of the words in the "*The Quranic Arabic Corpus*". AraMorph tagged 46% of words as unknown words, while Stanford and our method tagged none as unknown. Finally, AraMorph produced 40% correctly-tagged words and Stanford produced 68% correctly-tagged words, while our method produced 68,501 correctly-tagged words (88%).
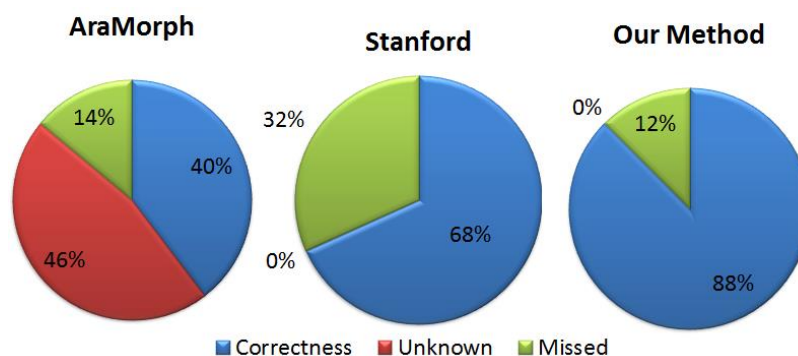

Figure 21: Proof of the validity of the methodology

	AraMorph	Stanford	Our Method
Correctness	40%	68%	88%
Unknown	46%	0%	0%
Missed	14%	32%	12%

Figure 22: The Comparison Table

4.6   Conclusions

We conclude that, because Arabic language has static verb derivations and a limited number of words, a list of all of the Verbs and Articles in Arabic language has been created. Our hypothesis states that, if the word from the text was not found in our list, it is a Noun. Therefore, Nouns are found through the elimination of Verbs and Articles.

After gathering over 112 million words (*verbs and articles*), a model was built to apply our method and test it. Our method has the highest number of correct tags compared with two other well-known Arabic POS tagging systems.

We conclude that our method, compared to AraMorph (a rule-based Arabic tagger) and the Stanford POS tagger, is far more efficient and accurate.

We have proved that the simplicity of our design, with it large-scale data comparisons, is far more effective than the complexity of the other methods.

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Periodontally Accelerated Osteogenic Orthodontics (PAOO) vs Osteoperforations (A Review on Periodontal Reactions to Orthodontic Tooth Movement)

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Abstract

A high number of adult patients are undertaking orthodontic treatment now because of the newer methods, technology, and innovations available in the market. Orthodontic profession is continually looking for new ways to perform treatment effectively for such patients, as there are many differences in the biology, motivation, and treatment objectives between adults and children. Aligner therapy and mini-implants are some of the ways of managing orthodontic treatment for adult patients. Treatment time is a concern for adult patients and methods to accelerate the orthodontic tooth movement have been a focus in the orthodontic field. Periodontal accelerated osteogenic orthodontics (PAOO) is a surgical procedure that is performed with a combination of alveolar corticotomy, bone grafting, followed by orthodontic treatment. This procedure uses the principle of regional acceleratory phenomenon (RAP).

Another procedure commonly used for accelerated orthodontic tooth movement is osteoperforations. This is a minimally invasive procedure, which does not include a flap surgery.

The purpose of this article is to describe the differences between adult and children periodontal tissues, the use of different appliances for adult treatment, how orthodontic treatment has been modified for adult patients, and the detailed explanation of procedures for accelerating orthodontic tooth movement such as PAOO and osteoperforations and the potential complications

Keywords: Periodontics, orthodontics, Periodontal accelerated osteogenic orthodontics, adults**.**

1. Introduction

There has been an upsurge in the number of adult patients undertaking orthodontic treatment.[1] multiple differences have been identified in the biology of alveolar bone, periodontal tissues, and gingival health between adult and adolescent patients. The motivations for adult patients are different from that of children. The objectives of the treatment also have to be adjusted accordingly. Mainly the adults' patients are concerned about the facial and dental aesthetics, the color of orthodontic appliances, and the time of orthodontic treatment. Frequently, adults have missing teeth and therefore the treatment planning needs to include other specialties. Adults do not grow at the same rate as children and therefore is not an importance consideration while planning treatment.[2] at the same time, there is a higher amount of hyalinization that can occur due to orthodontic treatment in adult patients. When orthodontic force is applied, many cellular and vascular changes take place in the surrounding periodontal structures. In adults, the cell mobilization and conversion of collagen fibers in slower than in children. In adults, there is a higher chance of periodontal complications in adult patients.[3,4,5]

2. Materials and methods

An extensive literature search was done for the assessment of studies investigating the differences between biology, objectives, and treatment for children and adult patients.

The studies evaluating the new techniques such as aligner therapy, mini-implants, and acceleration of tooth movement were searched. Following these studies, the considerations for adult orthodontic treatment were compiled.

3. Results

<u>Considerations in adult orthodontic treatment</u>

Orthodontic treatment for adult patients is different as compared to children. For these reasons, in adult treatment the use of aligners which are esthetic, mini-implants, using light forces, and innovative design for reducing orthodontic treatment time is required.[6] Aligners are made of thermoplastic material and therefore are clear and an attractive esthetic option for most adult patients. Initially, aligners were used for limited orthodontic treatment. But nowadays, results have shown that aligners can be used to undertake complex orthodontic tooth movement as well.[7] Mini-implants can be used for the correction of complex malocclusion for orthodontic patients. Mini-implants can be used in adult patients for distalization procedures.[8] There are some applications with mini-implants in adults with open bite. In such cases, mini-implants can be used for posterior intrusion and result in correction of openbite especially in adult patients.[9] In some cases, mini-implants can be used for the correction of transverse discrepancies such as posterior crossbite with mini-implants supported rapid palatal expansion (MARPE) appliance. In adult patients, MARPE appliances give more skeletal expansion than dental expansion as the midpalatal suture is fused.[10] Expansion appliances used in children cannot be used in adults because of the differences in suture maturation.[11] MARPE appliances have high success rates, high stability and are found to be safe on Temporomandibular Joint.[12] MARPE appliances can be designed in different ways depending on the type of malocclusion.

MARPE appliance uses palatal mini implants which have shown high success rates compared to buccal mini implants.[13] It can also be designed with mini-implants on only one side of the mid-palatal suture so that the expansion takes place on only one side.[14] This kind of innovative biomechanical designs can help in decreasing the duration of orthodontic treatment.[14] Mini-implants can also be used for correction of protrusive teeth in adult patients by maximum retraction of anterior teeth.[15] For class III patients, mini-implants can be used to move the maxilla forward and counterclockwise rotation of mandible by intermaxillary elastics on maxillary and mandibular mini-implants.[16] The development of surgical procedures for acceleration of orthodontic treatment has provided new solutions for the limitations of orthodontic treatment in adults. Some of prominent methods are the periodontally accelerated osteogenic orthodontics (PAOO) and osteoperforations. The aim of this article is to present comprehensive review of the literature, including the historical background, contemporary clinical techniques, indications, contraindications, complications and side effects.

4. Discussion

<u>Periodontal accelerated osteogenic orthodontics (PAOO)</u>

With PAOO, there is an increase in the net alveolar volume once the orthodontic treatment is completed. This technique utilizes a combination of selective decortications and alveolar augmentations.[17] There are multiple advantages with this technique such as a decrease in the treatment duration, increased in the maxillary expansion, conducting differential tooth movement leading to higher desired tooth movement and lower undesired tooth movement, faster and predictable movement for impactions, and finally higher stability after orthodontic treatment.[18] The PAOO technique enables the orthodontist to move the teeth in situations with low preexisting alveolar volume. It also increases the extent of movement that can be achieved safely by 2 to 3 times and reduce the time with orthodontic treatment.[19]

In PAOO technique, surgical scarring of the cortical bone is performed on the labial-aspects and the lingual-aspects of teeth.[20] This is followed by grating of the alveolar bone. The procedure is performed on the teeth that need to be moved more extensively for the purpose of orthodontic treatment. The teeth that do not required movement are not included in the procedure. For example, in a patient with extractions of four first premolars, if the treatment objective is to retract the maxillary incisors to the full extent possible and reduce the amount of anchorage loss of maxillary molars, the procedure is performed only for the anterior teeth. However, if the objective is to protract mandibular second molar in the missing mandibular first molar space, then the PAOO technique will be performed for the mandibular second molar and not on the anteriors. In this way, selective and differential tooth movement can be achieved for the desired objectives. After the PAOO technique is performed, the patient is recalled after 2 weeks to identify the tooth movement and perform the necessary changes with more frequent orthodontic adjustments. The rapid tooth movement that occurs with PAOO is difference than that with normal tooth movement. It has been reported that a localized osteoporosis like condition occurs after PAOO as a healing process.[21] This occurs due to a regional accelerator phenomenon (RAP) which was first described by Robert Frost.[22] RAP occurs after a normal injury to tissues such as fracture, or it can be induced due to surgical procedures such as osteotomy, bone-grafting, or osteoperforations.[22,23]

Osteoperforations

A less invasive manner of inducing RAP is to do minimally invasive surgery like osteoperforations. Osteoperforations are performed by penetrating the mucosa and alveolar bone in the region of interest.[24] This method is performed adjacent to the teeth where increased rate of tooth movement is desired. It is not performed on the teeth where minimal orthodontic tooth movement is desired to allow the utilization of the differential tooth movement process. This can be done by perforating the gingiva and bone at three locations around the teeth to be moved.

When osteoperforations are performed, it is found that the alveolar bone volume decreases.[25] This results due to increase in the number of osteoclasts. Because of the increased osteoclasts, there is increased rate of resorption of bone.[25] The inflammatory process after osteoperforations last for a period of 2-3 months.[26] This is the period when there is a higher rate of bone resorption. The rate of bone resorption is important in modulating the increase or decrease in the rate of tooth movement.[27] The effects of osteoperforations can be extended for a longer duration if the osteoperforations are made again after a period to increase the inflammatory response. The downside of accelerating tooth movement with these methods is the root resorption that accompanies the tooth movement.[28] This has been a concern for most clinicians since a long time with the osteoperforation procedures and its utility in clinical practice. A recent study has found a solution to this problem. It has been shown that when the osteoperforations are performed 5 mm farther to the molar tooth, then the root resorption is reduced significantly.[29] With osteoperforations farther from the molars, there is still a significant acceleration of the tooth movement.[29]

Complications and Side effects

PAOO is a surgical procedure and therefore there have been reports of adverse effects to the periodontium after the procedure. The patients may present with no symptoms to interdental bone loss, reduced attached gingiva, periodontal defects specially if there is short interdental distance before the surgery.[18, 30-32] With corticotomies, there have been reported incidences of hematomas developing subcutaneously in the head and neck region.[33, 34] There is also post-operative swelling and pain after such a procedure.[35-39] On the other hand, osteoperforations are a minimally invasive procedure. It does not require to raise a surgical flap like in PAOO. This leads to less complication rate than PAOO.

5. Conclusion

Adult orthodontic treatment is different than children. The techniques of aligner therapy and mini-implants have opened a lot of new treatment options and appliance designs for orthodontists. Acceleration of orthodontic tooth movement can be achieved in different ways. PAOO technique is one such option that helps in rapid alignment of teeth and decreased the treatment duration. With a combination of periodontal surgery and orthodontic treatment, the esthetics of patients can be affected positively to as a significantly degree. The downside of PAOO is the surgical complications and the associated cost. Osteoperforations can be performed as a less invasive method for acceleration of tooth movement when indicated.

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The Elements Contributing to Tax Evasion in Saudi Arabia

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Abstract:

The Saudi Arabian's vision had uplifted the Saudi economy within a short time span by adopting different strategic legislation. One of the main adaptations by the Saudi government that assess this uplift was through adopting taxation. As a new legislation it was faced a lot of resistance by the citizen, which led to tax evasion. The study had conducted through mean of survey that focused on testing two main hypotheses to see the relationship between two main groups (morality and understanding) to tax evasion. As it showed the hypothesis was supported by the data collected that both the level of morality do plays a massive role in the perception of tax evasion; moreover, that the level of awareness the individuals have is low to medium level when it comes to understanding the tax rules and regulations.

Keywords: Elements, Tax Evasion, Saudi Arabia

1. Introduction:

The Saudi Arabian's vision has introduced a new concept and regulation in the country. It opened new markets and new fields that if properly exploited would uplift the country and its economy even further. One of the main legislations that the Saudi government has recently adapted and the focus of this paper is taxation. Taxation is not a new concept in the world; yet, to Saudi citizens, it is considered to be a new phenomenon that the government is applying.

When Zakat, Tax and Customs Authority (ZATCA) first introduced Tax regulation in Saudi Arabia there was a lot of resistance; which was highly expected as per human nature.

Yet the resistances had taken a deeper sense, and individual started to use alternative measures such as tax evasion to avoid paying tax. The research paper focuses in the tax evasion and the elements that led to such act.

The research grouped the elements in to two groups that build the hypothesis around them. The first group the paper focused on is the moral aspect of the individuals and how it affects their decision when it comes to tax evasion. The second group the paper focused on is the elements of understandability of the tax rules and regulation and their effect on committing tax evasion. Throughout the data collected and analyzed from the survey conducted within the region, it had concluded that the elements of the tax evasion do indeed relate directly to the perception of morality and the level of understanding they might have in regards to tax rules and the regulation in general.

2. Literature Review:

Tax evasion has become a global pandemic continuously draining government revenue all around the world. It is considered one of the significant issues for tax authorities for several decades. As it has been stated by Popescu, L [4]"Tax evasion represents one of the most important economic and social phenomena that all countries in the world are currently facing". The topic of tax evasion is indeed an important topic for tax authorities to try to close the gap as much as possible.

Many researchers and economists tried to exploit the topic of tax evasion and identify what possible outcomes that best explain the reason behind such act, or even what new legislation could be imposed to close the gap in tax evasion. Taxes are considered a relatively new concept in Saudi Arabia; where it had been first introduced in 2004. However, this study is focusing on tax evasion in the Value Added Ta-x in specific which has been introduced since 2018.[1]

According to ZATCA, "Value Added Tax (or VAT) is an indirect tax imposed on all goods and services that are bought and sold by businesses, with a few exceptions (ZATCA, 2019)[2]. VAT is applied in more than 160 countries around the world as a reliable source of revenue for state budgets."[2] At first VAT has been imposed at the rate of 5% of most goods and services, where according to the world bank it had provided the government with SR7.26 billion in revenue from VAT [3]. In 2020 the government as a means of reviving the national economy had tripled the rate to reach the 15%. With this increase, there has been a lot of resentment and resistance from individuals and citizens by this increase.

This study will focus on the factors and elements that might lead the individual to engage in tax evasion in Saudi Arabia. we examine tax evasion from a social and psychological point of view, focusing on the variable and the understandability of the individuals for the important role taxes has on the nation's economy. We will use surveys as a means to measure the behaviors factors that affect tax evasion. Among the behavior factor, we will examine the complexity and understandability of the tax regulation, moral behavior, and the perception of fairness, and economical aspects of individuals. After careful consideration, we were able to join the elements into two groups, moral behavior on the individualism and complexity and understandability of tax regulation

2.1. Moral behavior

Under this element, we are combining both moral behaviors toward tax evasion along with the perception that might the individuals develop toward the tax policies and regulation (the fairness of the VAT system or the lack of services provided in return) that could lead to evading tax. The norms and morality of the individuals play a significant role in the perception the individual may uphold, which should never be taken for granted[5].

Different studies conducted within the same elements had reached the same conclusion concerning the positive relationship the tax evasion and perception of justice (Latina and Palivos)[6] and the extent of tax evasion the individuals my willingly reach to evades (Nicolin D)[7]. Last but not least Alzubi, K, had summaries the most crucial point when it comes to morality; that the stronger the ethical factors and moral behavior the individual holds the more compliance they will be toward taxes from the perspective of income taxes

2.2. Complexity and Understandability of Tax Regulation

Tax regulation and tax guides' existence are the ones of taxpayers' right, yet the simplicity of such guidance that allows the tax payer to fully understand the rules and legislation that guides hold. In this study, we try to explore the understandability of tax guidance and the accessibility of such guidance to all individuals, and the extent of following the guidelines.

According to Ali, Ahmed, and Abdul Hamid, one of the main motivations for tax evasion is the lack of proper legislation and the loopholes that individuals might exploit. Which has been reached by Dr. ilyess, G[(9)] Also, the absence the awareness individuals have toward tax and the importance of it to the national economy does lead to evasion to tax[8]. Whereas both Nicoline D[10] and   Almansour had argued that the complexity and tightness of regulation make it difficult to effectively follow it and boost evasion of tax

Based on the above literature, we developed the following hypotheses below to examine the reason for tax evasion in Saudi Arabia:

H1: The level of morality and perception of fairness in the individual norm play an important role in tax evasion

H2: The complexity of regulation or the lack of individual knowledge toward the importance of the VAT on the national economy.

3. Results and Discussions

3.1 Introduction

This research is a descriptive research, as it was mentioned in the methodology (first chapter); the main research objective is to show the elements of the tax evasion do indeed

relate directly to the perception of morality and the level of understanding that they might have in regards to tax rules and the regulation in general in Saudi Arabia. Based on examining only a portion of the total population, selected in a way that reflects the structure of the whole. In achieving objectives through this research, the researcher employed the questionnaire survey - as a means of gathering information. This suggests that attitudes are mental positions that cannot be observed directly, but must be analyzed based on research results. The fact that attitudes are learned affirms they will be affected by information and experience.

Moreover, this part aims at analyzing the data that was collected from the research sample, testing the hypotheses, and reaching the results. The research is designed to combine both theoretical and empirical studies using different measures in measuring the variables included in the research hypotheses according to the types of the variables.

Quantitative data was gathered also through the use of questionnaires (close-ended questions), administered during intercepts.

The questionnaire was designed to collect information on Leoni Wiring Systems Organization to explore about the opinion, views, contributions and variables and studying the elements of the tax evasion do indeed relate directly to the perception of morality and the level of understanding that they might have in regards to tax rules and the regulation in general in Saudi Arabia where a survey questionnaire will be used to collect the required data. The level of scale was interval and the technique was five point Likert type scale at the numeral 1 with the verbal statement 'strongly disagree' and at the numeral 5 with the verbal statement 'strongly agree'.

The Researcher was keen after the completion of data collection in every single of sample to review these data in every form, in order to ensure the completeness of data, and the veracity of the information, and to check the rate of yield to these forms and the wastage in the data. After the completion of the review of the final form, The Researcher moved to a new stage, It is converting the raw data into numbers to be handled statistically, To achieve that,

The researcher used the manual coding to convert large quantities of raw data in the form of a questionnaire to shortlist data to fit the dump data and the statistical analysis process later. Preliminary data have been received in the form converted to digital codes in the manual coding, According to the rules and standards of the units of measurement that have been developed to measure the variables properties that involved in the study .

The answers to each paragraph was in accordance with the Fifth Likert Scale as follows:

The Category	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Degree	5	4	3	2	1

After the completion of phase of encoding data in which the transfer of this data from its qualitative form to quantitative form, Then this data has transferred the amount allocated to discharge cards. Therefore, according to the previous rules Serial numbers has to interview forms to reflect every single of forms of single of the vocabulary of the research community.

3.2 Data and Methodology

The collected data has been summarized in a table format in the Excel file. Additionally, the data has also been placed in an SPSS file format for analysis. In Excel, the variable format is in words, while SPSS variable formats are in numbers (Okagbue et al., 2021). The data will be analyzed through different statistical methods that best analyze and measure the date at hand. The total number of participants for the study was 63. However, only 61 participants provided complete data. Hence, the data of 2 participants were excluded from the study.

3.3 Research Limitation

The study recognizes several limitations such as

1. This study population is in Saudi Arabia.
2. There are some limitations in the amount of information. It will obtain from daily life.

3.4 Statistical Methods are used :

The researcher in conducting statistical analyzes on the Statistical Package for the hypotheses as to rely on the following statistical methods program :-(SPSS) win, which depends on the following statistical methods

This chapter presents the empirical study conducted in Saudi Arabia. The chapter statistically analyzes the data gathered from the research sample, using the statistical program for Social Science (SPSS). The statistical analysis techniques include the following:

1. Cronbach's Alpha to test the reliability of questionnaire that used
2. Correlation Coefficients to test the factor analysis of questionnaire that used
3. Kolmogorov-Smirnov analysis to test normality of distribution
4. Descriptive statistics for all main variables and their dimensions.
5. Pearson Correlation Coefficients analysis to test the correlation among the study variables
6. One sample t-test to test the difference among the study variables
7. ONE WAY ANOVA Test to test the difference among the study variables

It is worthy to mention that an alpha level of 0.05 was used for all statistical tests.

3.5 Measurement Model Assessment

This section of the study explains the procedures that the researcher has undertaken to examine the validity and reliability of the constructs. As for examining the validity, an exploratory factor analysis has been conducted on SPSS 26 to account for construct validity. For examining reliability, Cronbach's alpha has been extracted to evaluate the internal consistency of the measures that have been adopted for the purposes of this study.

3.6 Kolmogorov-Smirnov Test

The researcher used Kolmogorov-Smirnov to test normality of distribution also to check if the model follows the normal distribution or not as below:

Table (1) Show normality test by using Kolmogorov-Smirnov for the research model

Research Variables	Kolmogorov-Smirnov	*Sig.	Results
The average of research variables	.114	.001	Follow Normal distribution

* If the value of Sig is less than 0.05 model will follow the normal distribution

The above table shows Kolmogorov-Smirnov to test the normality distribution of the model and as noticed the value of sig. for Kolmogorov-Smirnov test was less than 0.05 and it means that the research model follows the normal distribution

3.7 Reliability Analysis

Reliability means that a measure or questionnaire should consistently reflect the construct that it is measuring [1]. Reliability is used to measure the same scale items multiple times, ensuring that the same result is found every time, as long as the underlying phenomenon is not changing. Reliability is also a measure of internal consistency between different items of the same construct. When a multiple-item scale is provided to respondents, and yield similar score every time even if it is completed at two different points in time, this is a reflection of internal consistency. Therefore, it can be said that reliability can be estimated in terms of average inter-item correlation, average item-to-total correlation, or more commonly, Cronbach's alpha [2]. In this study, reliability of each scale has been tested through Cronbach's alpha to identify the internal consistency of the scale .

The alpha coefficient value depends on the number of items on the scale. In general, reliabilities less than 0.6 are considered poor, the 0.7 range, accepted, and over 0.8 good[3]

[1] Field, A. (2009). Discovering Statistics Using SPSS: Introducing Statistical Method (3rd ed.). Thousand Oaks, CA: Sage Publications.
[2] Bhattacherjee, A. (2012). Social science research: principles, methods, and practices.
[3] Sekaran, U. (2003). Research Methods for Business: A skill Building Approach. New York: Wiley.

In a reliable scale all items should correlate with the total. So, if items don't correlate with the overall score from the scale with their values being less than about 0.3 it means there are problems, as a particular item does not correlate very well with the scale overall.

 Items with low correlations may have to be dropped [4]. For the data in this study, all data have item-total correlations above

The following table summarizes the reliability test results for the study variables. All of the variables show an alpha coefficient of more than 0.6.

Table (2) Reliability Analysis for Research Variables

Variables	Cronbach's Alpha
The main average of the research model	.866

The results indicate that the research variables are measuring in the organization and It is intended to stabilize the scale and lack of contradiction with himself, he saw that it gives the same results if re-applied to the same sample and test stability using Cronbach alpha coefficient. the Cronbach alpha for the research model was 0.866. The coefficient of consistency takes values ranging between zero and the right one, if there was no data on the stability of the value of this parameter equal to zero, and vice versa, where if there is a complete firming be the parameter value equal to the correct one. And therefore the closer the value of reliability coefficient of the correct one indicates that the Stability high

3.8 Descriptive Analysis

Reporting descriptive statistics so that the researcher is familiar with the data and understands the relationships between variables. In summary, a descriptive analysis of respondent profile in terms of gender and age have been presented. Summary statistics of the Frequencies, Percentages, Mean and Standard deviation for each of the variables in the model are reported in this section.

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(4) Field, A. (2009). Discovering Statistics Using SPSS: Introducing Statistical Method (3rd ed.). Thousand Oaks, CA: Sage Publications.

3.8.1 Frequencies and Percentages

Table (3) shows the descriptive statistics for the research demographic data

No.	Variable name	Label	Frequencies	Percentages
1	**Gender**	Male	24	39.3
		Female	37	60.7
2	**Age**	From 18 to 24 years	1	1.6
		From 25 to 34 years	15	24.6
		From 35 to 45 years	25	41.0
		More than 45 years	20	32.8
3	**Income level**	From 3000 to 4999	10	16.4
		From 5000 to 9999	11	18.0
		From 10000 to14999	6	9.8
		From 15000 to 19999	13	21.3
		More than 20000	21	34.4

The above table shows the descriptive statistics for the research demographic data and the researcher concluded that:

For Gender variable

The researcher found that the total sample Males were 24 samples and the total sample of Females were 37 samples, giving a total of 61 respondents in Saudi Arabia as shown in the below figure.

Figure (1) gender
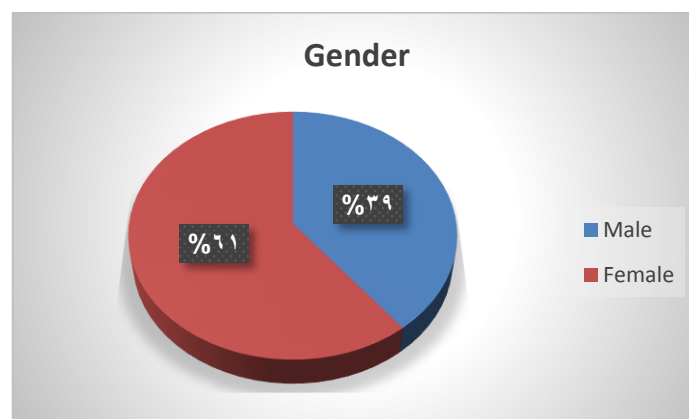
For age variable

The researcher found that the total sample of who are in age interval "From 18 to 24 years" was one sample, The researcher found that the total sample of who are in age interval "From 25 to 34 years" were 15 samples, The researcher found that the total sample of who are in age interval "From 35 to 45 years" were 25 samples, while The researcher found that the total sample of who are in age interval "More than 45 years" were 20 samples, giving a total of 61 respondents in Saudi Arabia as shown in the below figure.

Figure (2) Age Range
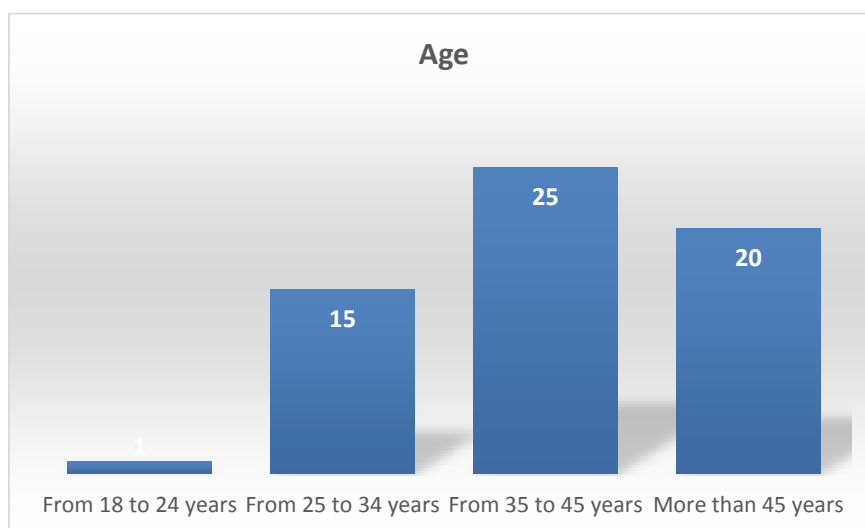
For Income variable

The researcher found that the total sample of who have "From 3000 to 4999" were 10 samples, The researcher found that the total sample of who have "From 5000 to 9999" were 11 samples, The researcher found that the total sample of who have "From 10000 to14999" were 6 samples, The researcher found that the total sample of who have "From 15000 to 19999" were 13 samples, while The researcher found that the total sample of who have "More than 20000" were 21 samples, giving a total of 61 respondents in Saudi Arabia as shown in the below figure.

Figure (3) Income Range
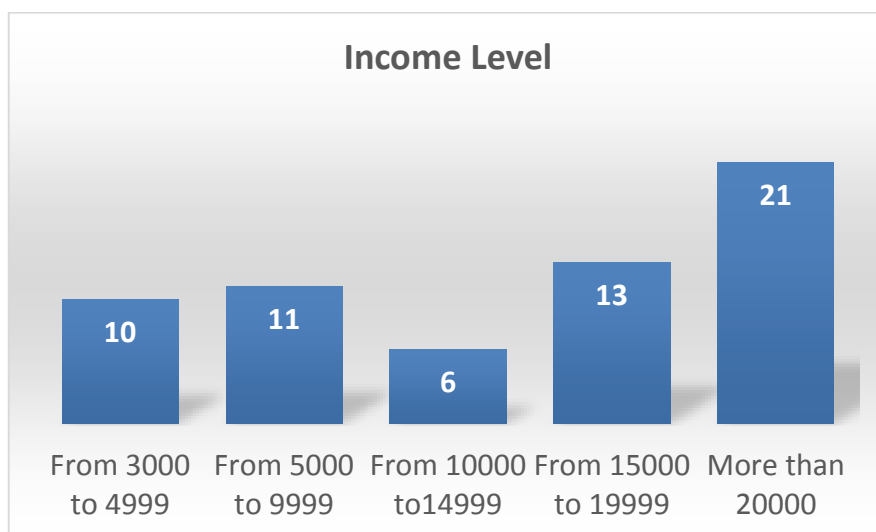
4. How familiar are you with tax law?

Table (4) shows the descriptive statistics for "How familiar are you with tax law?"

Variable	Frequency	Percent	Cumulative Percent
No clue	10	16.4	16.4
Low level	23	37.7	54.1
Mid-level	22	36.1	90.2
High level	6	9.8	100.0
Total	61	100.0	

The above table shows the descriptive statistics for "How familiar are you with tax law?" variable and the researcher concluded that who chose No clue were 10 samples, who chose Low level were 23 samples, who chose Mid-level were 22 samples, while who chose High level were 6 samples, giving a total of 61 respondents in Saudi Arabia as shown in the below figure.

Figure (4) how familiar are you with tax law?

How familiar are you with tax law

No clue	Low level	Mid level	High level
10	23	22	6
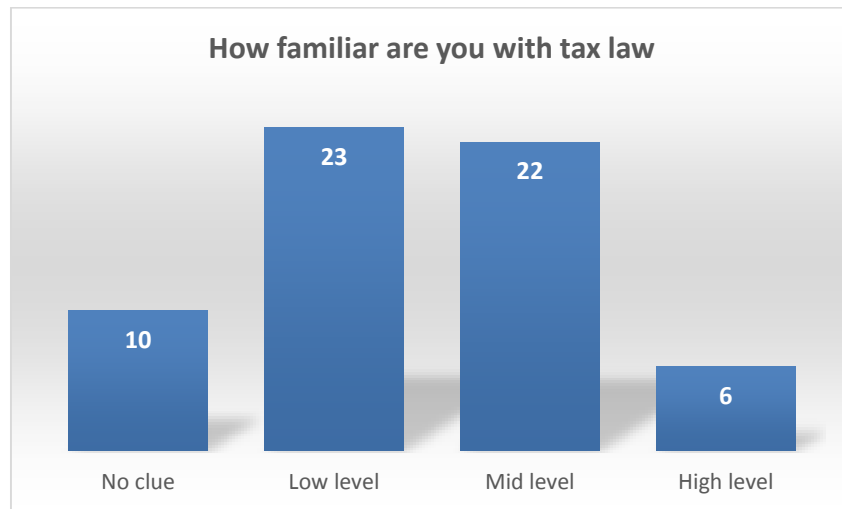
5. Have you attended introductory meetings or seminars on the implementation of value added tax?

Table (5) shows the descriptive statistics for "Have you attended introductory meetings or seminars on the implementation of value added tax?" Variable

	Frequency	Percent	Cumulative Percent
No	48	78.7	78.7
Yes	13	21.3	100.0
Total	61	100.0	

The above table shows the descriptive statistics for "Have you attended introductory meetings or seminars on the implementation of value added tax?" variable and the researcher concluded that who chose No were 48 samples while who chose Yes were 13 samples, giving a total of 61 respondents in Saudi Arabia as shown in the below figure.

Figure (6) Have you attended seminars or meeting in value added tax?
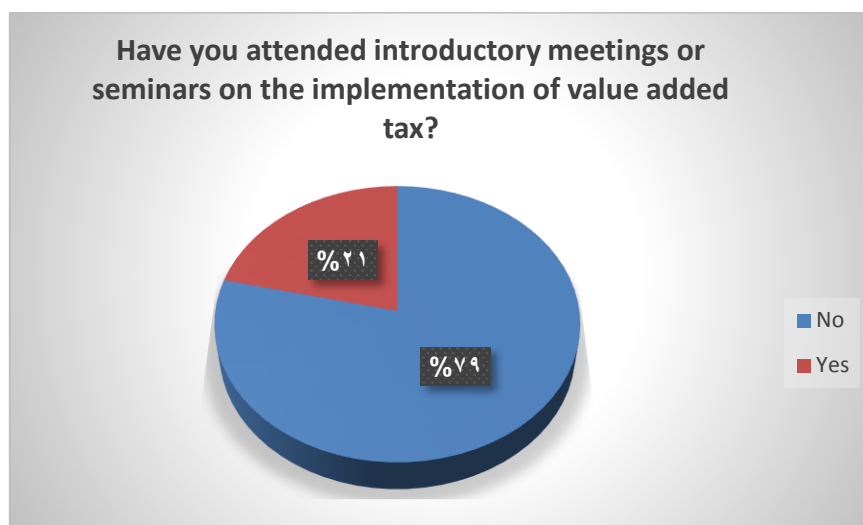
6. **How many introductory meetings or seminars that you attended on the implementation of value added tax?**

Table (6) shows the descriptive statistics for "How many introductory meetings or seminars that you attended on the implementation of value added tax?" Variable

	Frequency	Percent	Cumulative Percent
No	48	78.7	78.7
1.00	5	8.2	86.9
2.00	3	4.9	91.8
3.00	2	3.3	95.1
4.00	1	1.6	96.7
10.00	1	1.6	98.4
15.00	1	1.6	100.0
Total	61	100.0	

The above table shows the descriptive statistics for "How many introductory meetings or seminars that you attended on the implementation of value added tax?" variable and the researcher concluded that who chose one introductory meetings or seminars were 5 samples, who chose 2 introductory meetings or seminars were 3 samples,

While who chose 3 introductory meetings or seminars were 2 samples, giving a total of 61 respondents in Saudi Arabia as shown in the below figure.

Figure (7) how many seminars have you attend?
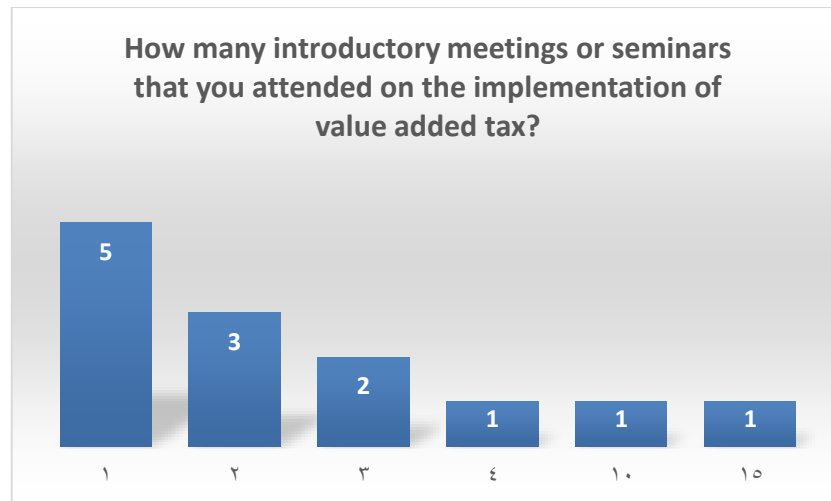
6- Do you support the tax law?

Table (7) shows the descriptive statistics for "Do you support the tax law?" Variable

	Frequency	Percent	Cumulative Percent
No	42	68.9	68.9
Yes	19	31.1	100.0
Total	61	100.0	

The above table shows the descriptive statistics for "Do you support the tax law?" variable and the researcher concluded that who chose No were 42 samples, while who chose Yes were 19 samples, giving a total of 61 respondents in Saudi Arabia as shown in the below figure.

Figure (8) Do you support tax law?
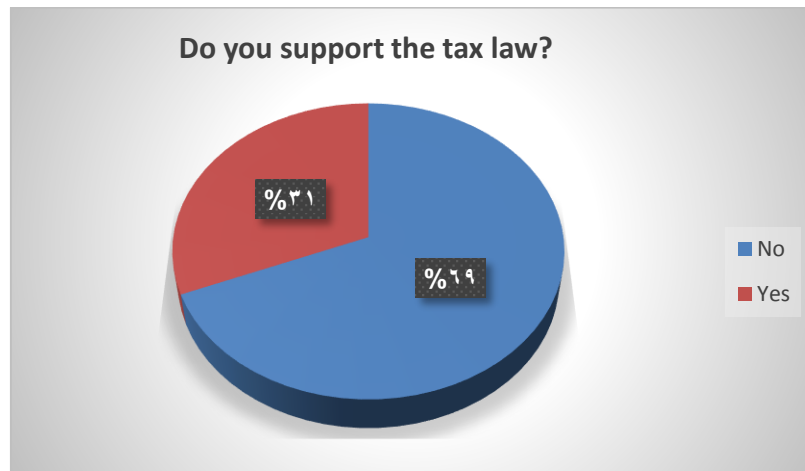
3.8.2 Mean and Std and Relative Importance

Table (8) shows Mean and Std and Relative Importance for the research model

No	Statement	Mean	Std. Deviation	Relative Importance	Rank
7	7 High rate of added tax	3.36	1.56	67.21	5
8	Feeling of not getting services for the value of the tax	3.92	1.27	78.36	1
9	Seller's low economic status	3.59	1.22	71.80	3
10	Laws and regulations related to the value added tax	3.08	0.97	61.64	6
11	The absence of tax awareness and its benefit to the state for the seller	3.61	1.20	72.13	2
12	the high prices of government transactions	3.51	1.12	70.16	4
13	Difficulty in procedures of government transactions	2.95	1.40	59.02	9

No	Statement	Mean	Std. Deviation	Relative Importance	Rank
14	There is nothing wrong with the process of tax evasion as long as the value of tax evasion is minimal	1.69	1.06	33.77	11
15	There is nothing wrong with tax evasion if the evasion is by using legal loopholes in the system	2.31	1.47	46.23	10
16	I don't mind dispensing with the bill in return for the 15% VAT deduction	3.07	1.41	61.31	8
17	9. Have you ever been in a situation where you have resorted to tax evasion?	3.08	1.28	61.64	7
	The main average of the research model	**2.92**	**0.54**	**58.31**	

According to the previous table, it can be concluded that:

The relative importance of the element "Feeling of not getting services for the value of the tax" is 78.36% and its mean is 3.92 while its standard deviation is 1.27, comes at the first rank and the relative importance of the element "The absence of tax awareness and its benefit to the state for the seller" is 72.13% and its mean is 3.61 while its standard deviation is 1.2, comes at the second rank while the relative importance of the element "There is nothing wrong with the process of tax evasion as long as the value of tax evasion is minimal" is 33.77% and its mean is 1.69 while its standard deviation is 1.06, comes at the last rank

The relative importance of the whole model is 58.31% and its mean is 2.92 while its standard deviation is 0.54

18. Do you think that with the country's economy recovering, the value-added tax should?

Table (9) shows the descriptive statistics for "Do you think that with the country's economy recovering, the value-added tax should?" Variable

	Frequency	Percent	Cumulative Percent
stay as is	1	1.6	1.6
decreases by small amount	26	42.6	44.3
CANCELED	34	55.7	100.0
Total	61	100.0	

The above table shows the descriptive statistics for "Do you think that with the country's economy recovering, the value-added tax should?" variable and the researcher concluded that who chose economy will stay as it is was only one sample, who chose decreases by small amount were 26 samples, while who chose Cancelled were 34 samples giving a total of 61 respondents in Saudi Arabia as shown in the below figure.

Figure (9) Do you think that with the country's economy recovering, the value-added tax should?

Do you think that with the country's economy recovering, the value-added tax should?
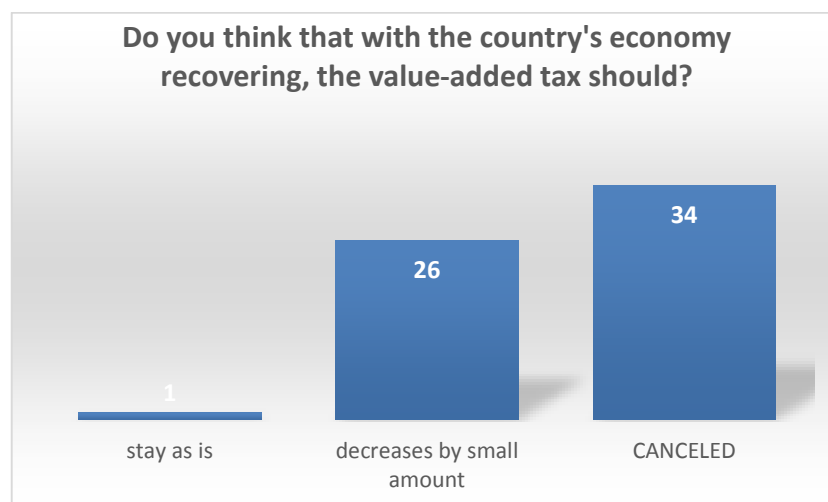
3.8.3 One-Sample t-test

Table (10) One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
How familiar are you with tax law?	61	2.61	.881	.113
Laws and regulations related to the value added tax	61	3.08	.971	.124
The absence of tax awareness and its benefit to the state for the seller	61	3.61	1.201	.154
the high prices of government transactions	61	3.51	1.120	.143
Difficulty in procedures of government transactions	61	2.95	1.396	.179
Do you think that with the country's economy recovering, the value-added tax should?	61	2.54	.535	.068

A one-sample t-test is used to establish whether the mean of a given population is equal to a given value. It can also generate descriptive values (Ross & Willson, 2017). The selected variables range from "strongly disagree" to "strongly agree," with values from 1 to 5, respectively. Since 3 represented a neutral opinion, it was used as the test value. Any value below 3 indicates a disagreement with the variable. Values greater than 3 show an agreement with the variable. Table 6 provides the mean value of the selected groups. "How familiar are you with tax law?" has a mean of 2.61. The values range from 1 to 4, which represents "high level" to "no clue," respectively. That shows that the majority of the participants have mid-level to low-level knowledge regarding tax law.

Table (11) One-Sample t-test

| | Test Value = 3 | | | | | |
| | | | | | 95% Confidence Interval of the Difference | |
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
How familiar are you with tax law?	-3.488	60	.001	-.393	-.62	-.17
Laws and regulations related to the value added tax	.659	60	.512	.082	-.17	.33
The absence of tax awareness and its benefit to the state for the seller	3.944	60	.000	.607	.30	.91
the high prices of government transactions	3.544	60	.001	.508	.22	.80
Difficulty in procedures of government transactions	-.275	60	.784	-.049	-.41	.31
Do you think that with the country's economy recovering, the value-added tax should?	-6.706	60	.000	-.459	-.60	-.32

The variables "laws and regulations related to value-added tax" and "absence of tax awareness and its benefit to seller" have means of 3.08 and 3.61 respectively. Since the values of 1-4 representing "strongly disagree" and "strongly agree," the participants agree with these statements. The variable "high prices of government transactions" has a mean of 3.51, which shows that participants agree that the government transactions are high. Lastly, the variables "difficulty in procedures of government transactions" and "do you think that value-added tax should?" have means of 2.95 and 2.54 respectively. More participants are in a neutral position when it comes to the difficulty of conducting government transactions. The bottom variable has values ranging from 1 to 3, which represents "canceled," "decrease a little," and "stay as it is". Since the mean is 2.54, most of the respondents believe that the tax value should be slightly decreased.

Table (12) One-sample statistics for meeting attendance

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Have you attended introductory meetings or semenars on the implementation of value added tax?	61	1.95	.284	.036

The above table shows that the mean of participants attending seminars on tax implementation is 1.95. Herein, 1 represents "yes," and 2 stands for "no." The mean of 1.95 signifies that the majority of the participants did not attend seminars on tax implementation.

Thus, the H2 that implies that **the complexity of regulation or the lack of individual knowledge toward the importance of the VAT on the national economy** is supported. That is because the participants have a moderate to low level of awareness concerning tax law. Moreover, almost all the participants have not attended any tax implementation seminars.

3.8.4 One-way ANOVA

In one-way ANOVA, morality is compared with tax evasion. Furthermore, one-way ANOVA is used to compare the means of three or more groups (Kaltenbach, 2021). As shown in the below table:-

Table (13) Descriptive ANOVA

Descriptive

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound
not having governmental services for the VAT taken	strongly disagree	27	3.33	1.519	.292	2.73	3.93
	Disagree	11	4.27	.786	.237	3.74	4.80
	neutral	8	3.88	.835	.295	3.18	4.57
	agree	7	4.71	.756	.286	4.02	5.41
	strongly agree	8	4.75	.463	.164	4.36	5.14
	Total	61	3.92	1.269	.162	3.59	4.24
the economic condition for the VAT payee	strongly disagree	27	3.07	1.238	.238	2.58	3.56
	Disagree	11	4.09	1.044	.315	3.39	4.79
	neutral	8	3.88	.835	.295	3.18	4.57
	agree	7	3.86	1.215	.459	2.73	4.98
	strongly agree	8	4.13	1.246	.441	3.08	5.17
	Total	61	3.59	1.216	.156	3.28	3.90
I dont mind discussing the bill in return for 15% VAT deduction in the amount	strongly disagree	27	2.44	1.368	.263	1.90	2.99
	Disagree	11	2.64	1.027	.310	1.95	3.33
	neutral	8	3.25	.886	.313	2.51	3.99
	agree	7	4.14	1.069	.404	3.15	5.13
	strongly agree	8	4.63	1.061	.375	3.74	5.51
	Total	61	3.07	1.413	.181	2.70	3.43
Do you support the tax law	strongly disagree	27	2.00	.000	.000	2.00	2.00
	Disagree	11	2.00	.000	.000	2.00	2.00
	neutral	8	2.00	.000	.000	2.00	2.00
	agree	7	2.00	.000	.000	2.00	2.00
	strongly agree	8	2.00	.000	.000	2.00	2.00
	Total	61	2.00	.000	.000	2.00	2.00
Have you ever been in a situation where you have resorted to tax evasion	strongly disagree	27	2.00	.000	.000	2.00	2.00
	Disagree	11	2.00	.000	.000	2.00	2.00
	neutral	8	2.00	.000	.000	2.00	2.00
	agree	7	2.00	.000	.000	2.00	2.00
	strongly agree	8	2.00	.000	.000	2.00	2.00
	Total	61	2.00	.000	.000	2.00	2.00

The above table shows the descriptive values for selected variables. The variable "have you ever committed tax evasion" has a mean value of 2. In this variable, 1 represents "yes," while 2 represents "no". The result shows that all the participants did not commit tax evasion. Additionally, the variable "do you support tax law?" has an average of 2. Therefore, all respondents supported tax law. The rest of the variables have means of 3.92, 3.59, and 3.07, which shows that the participants slightly agree with the statements of "not having governmental services for VAT taken," "the economic condition for VAT payee," and "I don't mind dispensing the bill for 15% deduction".

Table (14) ANOVA

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
not having governmental services for the VAT taken	Between Groups	20.605	4	5.151	3.796	.008
	Within Groups	75.985	56	1.357		
	Total	96.590	60			
the economic condition for the VAT payee	Between Groups	13.386	4	3.347	2.487	.054
	Within Groups	75.368	56	1.346		
	Total	88.754	60			
i dont mind dispencing the bill in return for 15% VAT deduction in the amount	Between Groups	40.293	4	10.073	7.101	.000
	Within Groups	79.444	56	1.419		
	Total	119.738	60			
Do you support the tax law	Between Groups	.000	4	.000	.	.
	Within Groups	.000	56	.000		
	Total	.000	60			
Have you ever been in a situation where you have resorted to tax evasion	Between Groups	.000	4	.000	.	.
	Within Groups	.000	56	.000		
	Total	.000	60			

The above table shows the results of the ANOVA test and whether there is a statistical difference between the group means. The group "not having governmental services for VAT taken" has a significance value of 0.008. Since this value is lower than 0.05, there is a statistically significant difference between this group and the group of "it is acceptable to avoid tax payment as long as it is within a legal loophole". The group "the economic condition" has a significance value of 0.054. Since this value is greater than 0.05, there is no statistically significant value in this group. The rest of the tested groups also have no statistical significance values.

3.8.4 Correlation Matrix

Table (15) Correlation matrix

Correlations

		the increse rate of VAT	not having governmental services for the VAT taken	the economic condition for the VAT payee	it is acceptable to avoid payment as long as it is with small amount of evasion	tx evasion is acceptable as long as it within legal loopwhole	i dont mind dispencing the bill in return for 15% VAT deduction in the amount	Do you support the tax law	Have you ever been in a situation where you have resorted to tax evasion
the increse rate of VAT	Pearson Correlation	1	.478**	.281*	.211	.409**	.299*	.c	.c
	Sig. (2-tailed)		.000	.028	.103	.001	.019	.	.
	N	61	61	61	61	61	61	61	61
not having governmental services for the VAT taken	Pearson Correlation	.478**	1	.377**	.204	.417**	.524**	.c	.c
	Sig. (2-tailed)	.000		.003	.114	.001	.000	.	.
	N	61	61	61	61	61	61	61	61
the economic condition for the VAT payee	Pearson Correlation	.281*	.377**	1	.417**	.306*	.220	.c	.c
	Sig. (2-tailed)	.028	.003		.001	.016	.089	.	.
	N	61	61	61	61	61	61	61	61
it is acceptable to avoid payment as long as it is with small amount of evasion	Pearson Correlation	.211	.204	.417**	1	.644**	.382**	.c	.c
	Sig. (2-tailed)	.103	.114	.001		.000	.002	.	.
	N	61	61	61	61	61	61	61	61
tx evasion is acceptable as long as it within legal loopwhole	Pearson Correlation	.409**	.417**	.306*	.644**	1	.569**	.c	.c
	Sig. (2-tailed)	.001	.001	.016	.000		.000	.	.
	N	61	61	61	61	61	61	61	61
i dont mind dispencing the bill in return for 15% VAT deduction in the amount	Pearson Correlation	.299*	.524**	.220	.382**	.569**	1	.c	.c
	Sig. (2-tailed)	.019	.000	.089	.002	.000		.	.
	N	61	61	61	61	61	61	61	61
Do you support the tax law	Pearson Correlation	.c	.c	.c	.c	.c	.c	.c	.c
	Sig. (2-tailed)	.	.	.	.	.	.	.	.
	N	61	61	61	61	61	61	61	61

The above table shows the correlation matrix between selected variables. Pearson Correlation was selected since it indicates the relationship between groups. The values range from 1 to -1, which represents a strong positive or strong negative correlation (Schober et al., 2018). Hypothesis 1 shows the relationship between morality or perception of fairness and tax evasion. The variable "it is acceptable to avoid payment as long as it is within legal loophole" has strong correlations of 0.409, 0.417, 0.306, 0.644, and 0.569. It does not correlate with variables of "supporting tax law" and "evading tax". This is because these variables have the same value of 2.

Table (16) Descriptive of tax evasion if legal or small

	N	Mean	Std. Deviation	Std. Error Mean
it is acceptable to avoid payment as long as it is with small amount of evasion	61	1.69	1.057	.135
tx evasion is acceptable as long as it within legal loophole	61	2.31	1.467	.188

The above table shows that the mean of the selected groups is 1.69 and 2.31. Hence, the majority of the participants disagree with the idea of tax evasion even when it is within a legal loophole or small.

Thus, the H1 that implies that **the level of morality and perception of fairness in the individual norm play an important role in tax evasion** is supported because the majority of the participants disagreed on evading tax even when there was a legal loophole. Additionally, The ANOVA test has shown that there are no statistical differences between the majorities of the selected groups. Meanwhile, the correlation matrix shows that there is a strong correlation between most of the variables. The only variables that do not correlate are "supporting tax law" and "evading tax". All the participants do not evade tax and positively support tax law. Therefore, individuals avoid tax evasion due to morality standings.

Table (17) The effect of the results on the hypothesis

Hypothesis	Result
H1: The level of morality and perception of fairness in the individual norm play an important role in tax evasion.	Supported
H2: The complexity of regulation or the lack of individual knowledge toward the importance of the VAT on the national economy.	Supported

The first hypothesis confirms that the level of morality and perception of fairness in the individual norm affects tax evasion. From table 10, most of the respondents disagree with evading tax even when it is small or has a legal loophole. Apart from this, from the ANOVA and correlation matrix, all the participants do not evade tax law. They also fully support the implementation of tax law. Their perception of morality disregards the idea of tax evasion even when it has little implications. Hence, their view on morality significantly affects their perception of tax evasion.

The second hypothesis shows the relationship between lack of individual knowledge or complexity of tax regulation and the importance of VAT on the economy. That hypothesis is supported because the respondents have an overall medium to low level of knowledge regarding tax law. Moreover, all respondents have never attended any tax implementation seminars. Regardless of having limited knowledge, the participants still acknowledge the impact of taxes on the economy. For example, some of them acknowledge that the tax should be slightly decreased.

The government should make an effort in educating its citizens regarding taxes. When citizens know more about taxes, they will appreciate the role that taxes play in developing the economy.

4. Conclusion:

Tax plays an important role in our community, as it helps the government to provide further facilities that could uplift the country and community. The Saudi government had faced a lot of resistance in applying tax rules, which lead to tax evasion and avoidance by some individuals. This study is focusing on finding the relationship between morality and understanding tax rules with tax evasion and why individuals are keener to engage in such acts.

The study had focused on testing two main hypotheses to see the relationship between two main groups (morality and understanding) to tax evasion. As it showed the hypothesis was supported by the data collected. For instance, in H1: the level of morality do plays a massive role in the perception of tax evasion. Despite that, nearly 90% of the participant had not engaged in tax evasion, yet nearly all had agreed to spare the invoice in exchange for a 15% decrease in the total amount.

Furthermore, in H2: despite the massive awareness seminars that are being conducted by ZATCA, the level of awareness the individuals have is low to medium level when it comes to understanding the tax rules and regulations. Due to the resistance behavior, individuals are constrained from having a proper exposure to tax rules and regulations which caused the difficulties that some individuals are facing in applying or following tax legislation. Also, some responses reflected that misunderstanding and the complexity rely not on the rules and regulation rather on the benefits that they would have from paying taxes. Participants believe that they are entitled to having and exposure to where the taxes are being spent and having more facilities that would help them in their daily life in exchange for paying taxes.

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Some Important Secrets of Language Development

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Abstract:

Language is a jewel in the human body. If it is not available, no phenomenon can compensate for its absence. Every human with a language is known as a skillful person. If language is downfallen, almost all human beings' relations are damaged. Language, like all other phenomena of human culture, is closely linked to a human community, an event that occurs in a community, taking its own steps towards perfection in that community. Language is the only source of communication among the people. In fact, it is a source of reflection of the aspirations and desires of the people and a great tool for finding ways to meet their needs. In the process of research, I have clarified what language means, what it is called. As a result of the research, it has also become clear what is its value in social life, what is its importance. Language functions were also highlighted during the research. Some important factors and characteristics that lead to the development of a language are highlighted in details. If the speakers of any language take advantage of the mentioned ways to develop their language, to contrive for it to conclude all the mentioned possibilities and factors in their language, I am sure that their language will be taken place among the advanced languages.

Keywords: Language, importance of language, functions of language, ways of language development.

1. Introduction

Language is a social phenomenon, emerging in society. Life, survival, sustainability and development are inextricably linked with the life, sustainability and development of a human community. Research has shown as a community is moving forward, taking steps towards development, language also does the same. It is essential for the development of a language to have equal access to all aspects of social life.

Thus the results of human intellectual activity, which are felt in various ways, become usable and useful through language, and it is also possible to understand them through language. The value of language in social life demands to contrive for its development. The more a language progresses and develops, the better it can serve nations because the more interesting the understanding of a language, the more effective it is when it is developed in the community. I have done my research writing to the best of my ability with the strength of my pen and the review of others' sources. In this article, I have covered some of the factors, characteristics and conditions that can play an important role in the process of language development.

1.1 Research Questions

This research article has been written for the purpose to answer the following questions:

a) What are the factors, characteristics and ways of language development?

b) To what extent do the factors, characteristics and ways will help the language to take its own rapid steps towards development?

2. Literature Review

Taniwal (2009) argued about the development of a language as it should be a means of learning at the community level that all office works should be done, and it should be fully integrated into the media, such as it can be used in radio, television, internet, computer and other such devices. He goes on to say that in addition to this, it is necessary to be a general means of communication and understanding in daily life and work.

Taniwal further states that the scholars, researchers and writers of a language should be involved in writing and researching in their own language and publish their works in any field and present them to their society and people.

Words, proverbs, poems and prose of a language should be collected and separate dictionaries needs to be written in the relevant language. Valuable publications such as books, articles and so on should be translated from other languages. Current language and its values has to be translated into other languages employing all means of media such as Newspapers, Magazines, Radio, Television, Computer, Internet and so on. This has to be compared to other languages, shared traits has to be benefited and the financial development of that language speakers as Trade, industry, agriculture, exploitation of land resources, exports, etc. should be taken into consideration (Muslimdost, 2009).

In respect to the development of language, Shashai (2010) stated that speakers of the language should pay close attention to the authenticity and purity of their language, work hard in training and nurturing their original words, phrases and terms, in everyday speech and writing. Do not easily replace others' words, phrases, and idioms in conversations and writings instead of the ancient heritage of the fathers and grandfathers of their language.

Forming new terms and words is a modern language requirement and a systematic program is needed to do so. By doing so, particular theories will be suppressed, and the language will not be deprived of growth and development (Rafi, 2015).

If we have look at the above works, each scholar has shared at least some of the factors, methods and some secrets of the development of the language with readers as they could. No one of the works has not brought the mentioned methods and reasons for the development of the language in a regular, complete and systematic manner which is completely satisfactory and assurance. Noting the importance of such topic, it was necessary to further develop and expand the topic, so I decided to write a research paper under this title to the best of my ability to further develop the topic, clarify the remaining dark aspects and readers' unanswered questions may have been answered to some extent.

3. Language

Linguists have shared different definitions of language with us by bringing different letters and words, using different types of sentences, there are some differences between them in terms of content, but in general, there is a basic and important unity among them since, all linguists accept that language is a great source of understanding and communication. To further clarify the issue, some linguists have defined language as;

Mahbob (2017) defined language as; language is a collection of specific contracted symbols, each symbol indicating a mental image of us, so that for each symbol we have a specific objective image in mind. These images include things of human time and environment, characteristics, accidents, phenomena, actions and the relevant speaker's own ideas, thoughts, desires, demands, goals, feelings, reactions and everything else that is in the heart and mind.

Language is a source of sharing of information (Peshawrai, 2012).

Marhoon (2017) stated the definition of language as; Language is the part of the human body that makes meaningful and meaningless sounds out of one's mouth and these voices translate human thoughts.

Language is the sounds that human beings utter in order to express their thoughts and ideas through the vocal organs under a special order and system and thus communicate with each other (Shaker, 2019).

3.1 Importance of Language

Language is a unique gift from Almighty God to mankind. Without the use of language, human growth cannot take place because at any time and in any place, it is accompanied with human beings through thought, brain, worship, ideas, and relationships when talking to other human beings. Language is a storehouse of knowledge and a means of thinking, a transmitter of knowledge, situations, events and information from one generation to other, a great means of establishing relationships between human beings.

Language is what keeps the graph of the benefits of human life high because without language, a person would be in utter darkness, like an irrational animal. It is the ability of human beings to distinguish themselves from animals by combining letters and words (Niazai, 2012).

Ludin (2016) says language plays a very important role in providing jobs to the people. Language is a very important tool in regulating human activities, whether they are shared or not.

Language is a very high cultural value by which human has earned the title of the noblest of the universe. This great cultural value is a social phenomenon, emerging in community, connected to it. Lest, if it is removed from society, it loses its chance of survival. Thus, if the language of a human community is taken away, social life and the social system are destroyed. The doors of life, stability and development of a community are closed, the human community is plunged into a deep abyss and human culture is put to an end.

If there is no means of communication among the people, they will not be able to cope with the difficulties and find other ways to overcome them. If we look at the importance of language, we will see that language is the only way to get rid of rubbish and show the way. Human has charted the path of progress with the help of this tool and is witnessing great progress today. They shared their achievements and experiences and has taken advantage of them and made up for the shortcomings of their life (Taniwal, 2009).

3.2 Language Functions

In general, language is used for three purposes. They are as follows:

A. Language Information Function: This language function includes connection with others, information sharing, and communication.

B. Explicit Function: In this section, the speaker's thoughts, feelings, ethics, knowledge and capacity reach to the listener and in return, the same feelings are aroused in the listener, viewer or reader and the second person assumes that he/she is the first person.

C. Instructional Function: The function of language in this section is to recommend, instruct, and request whether or not to perform an action (Mahbob, 2017).

4. Ways of Language Development

Ludin (2016) says language is a social phenomenon. As the community develops, knowledge and technique flourish in it, so does the language of the community develop, and linguistic units are created for many subjects.

Language is a social phenomenon. It has evolved in accordance with social life and is in its infancy according to social, political and economic conditions. These social, political and economic conditions either promote or destroy and kill the language (Hilaman, 2012).

Ishaqzai (2020) stated some tips and secretes to help develop a language which are as follow:

• It is necessary to conduct scientific and educational workshops on language development.

• International and national exhibitions should be held.

• Terminology and terms should be protected.

• The use of language in tourism, foreign and international relations should be facilitated.

• Particular attention should be paid to the role of language in national literature.

• The aspects of printing and journalism (translation, research and creation) should be strengthened.

• Beyond the development of a language, it is essential to have national and standard spelling and composition.

• Observe linguistic and ethnic movements.

• To be kept away from the threat of colonial movements.

• Religious councils: Religious councils can play a major role in the promotion and financing of language and culture because religious and theological concepts are directly related to human emotion and psychological power.

In religious gatherings, concepts are expressed that have a profound effect on the emotional and psychological power of people and are handed down to human memory. It is a process that takes place in sacred and relatively sacred places, so if language is nurtured in places that enjoy the support and funding of the physical and spiritual power of society, then language develops gradually and abnormally.

• Music and acting: Music is also a very important element of folk culture, and its influence cannot be denied in the field of language and linguistics. Songs and music not only acquaint people with the phonemes and vocabulary of the language in public gatherings but also force people to memorize them. Representation, like an art, reflects the identity and existence of language and people, such as Attan, which is a symbol of Pashto and Pashtuns identity. In the field of acting, film, theatrical, dramatic and satirical scenarios are the major factors in the financing of language. Promoting and expanding take place among them.

 Furthermore, Taniwal (2020) also stated some tips and secretes which cause development of a language they are as follow:

• Language should be a means of understanding and communicating in the community or in the context of daily life. Here a language should be given priority based on the standards of linguistics and social structure.

• Be the language of learning, education and teaching.

• It should be given the power to communicate and use in economic, political, technical and other fields.

• Pay attention to the natural structure of a language.

• Since not all languages are progressing at the same level, the process of purification should be followed in order to prevent the use of the original words of a language and archeology, but in this case, the joint condition and consensus of scholars is the main condition. The government should support the decisions of scholars in this regard.

• Cultural aggression must be stopped on the basis of scientific principles. By doing so, the original culture and history of a society is saved from being distorted and lost.

• Illiteracy is one of the major cause of social misfortunes and suffers in the society. This point needs to be taken seriously. The government and academic centers have a great responsibility in this regard.

• It should be the official language.

Moreover, Muslimdost (2009) also explains some tips and secrets for language development as follows:

• Words, proverbs, poems, and prose of language should be collected and separate dictionaries should be written in language as well.

• It should have government patronage and enjoy political rights.

• An inclusive delegation of linguists should always be in close contact with language and language speakers and conduct their activities in the light of linguistic principles on linguistic topics as needed.

• It should be compared with other languages and take advantage of common values.

• All means of publication such as newspapers, magazines, radio, television, computer, internet and so on should be used in the dissemination of the language.

 Shashai (2010) says that the native speakers of any language should pay close attention to the authenticity and purity of their language. They should work tirelessly to educate and nurture their original words, phrases and idioms, and do not easily replace obscure words, phrases and idioms in everyday speech and writing, which are the ancient heritage of their fathers and grandfathers of language speakers.

Creating new expressions and words is a modern language requirement and a systematic program is needed to do so. By doing so, it will both prevent particular ideas and as well as language from destroying (Rafi, 2015).

5. Research Methodology

The research method of the article is based on library. Strong and reliable sources have been used in this research and the topics have been analyzed and discussed on the basis of scientific reasons.

6. Results and Discussion

The article provides accurate information to best determine the language, in this regard, the views of scholar have been included in it and analyzed and discussed according to the principles of research. Subsequently, the importance and value of language have been explored, and it has been shown that language is the highest principle of human art. For example, if a person has a beautiful body but is deprived of the blessings of language, then without a doubt, materially and spiritually very imperfect human being is known. During the research, accurate information about the functions of language is given to the readers. The main topic of the article, which is the some important secrets of language development, have been explored in the past where some articles have been published on it. For example, Taniwal has been explored the same topic but is insufficient. Also, Muslimdost has worked on the mentioned topic in his book which are the ways of language development and are a bit richer than Taniwal but still is inadequate and they are not in a position to answer many questions about it.

Shashai has given various views on the development of language, but not in a systematic way, as well as in Habibullah Rafi's work. There may be some useful results in the process of language development but not in such a way that many questions can be answered. I decided to study the subject extensively in the light of past works. Thankfully, I was able to make the most of it. Then I studied about the topic in such depth with the force of my pen and thought, in spite of extensive study, then I interpreted the issues one after the other in such a systematic way that as a result many dark aspects became clear. The article can answer a lot of questions related to the topic and the mentioned secrets can really play a vital and important role in the development of a language.

7. Conclusion

In the course of my research, I came to the conclusion that I should give the readers more accurate and reliable information about the definition and identity of the language. Then I have discussed the subject of the importance of language in the light of the views of various scholars. I then analyzed the topic of the functions of language and finally explained the main topic of the article which is the some important secrets of language development, using my knowledge and other authoritative sources to answer many of the questions related to the topic.

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