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| RESEARCH ARTICLE

Gemination Errors in Arabic-English Transliteration of Personal Names on Facebook

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| ABSTRACT

This study aimed to explore how Arabic native speakers transliterate personal names containing geminates to English on social media and what transliteration anomalies they produce. A sample of 406 English transliterations of Arabic personal names with geminates by Arabic native speakers was compiled from Facebook and analyzed to find out the percentage of Arabic names in which geminates were transliterated into double consonants correctly; the percentage of Arabic names in which geminated consonants were reduced to a singleton consonant in the English transliteration; and the percentage of Arabic names where a singleton consonant was doubled in the English transliteration. It was found that one third of the Arabic name tokens with geminates were transliterated correctly, i.e., the geminated consonant in Arabic was represented by a double consonant in the corresponding English transliteration as in compound names (*Abdullah, Noureddin)* and *Nassar, Algammal, Alqattan, Allam, Hagga* and son. In 41% of the name tokens, the geminate was represented by a single consonant in the corresponding English transliteration as in *Amouna, Amool, Elzahar, Hamam, Elnagar, Sedeek, Fatouh*. In 26% of the English transliterations, a single consonant was doubled in the corresponding transliteration, although the Arabic name has no geminates and the consonant is pronounced as a single phoneme as in *Ahmmed, Anass, Ossama, Quassem, Sammar, Wissam, Yassin, Youniss*. The most commonly geminated consonant was the s which comprised 23% of the tokens. Since Arabic geminates are spelled with a single consonant and a diacritical mark ّ that is not usually shown in the written form used by Arab adults, Arabic speakers tended to transfer the spelling of Arabic geminates into a single consonant in English. They also overgeneralized double consonants in the English transliteration of Arabic names that are pronounced with a single consonant phoneme. Recommendations for improving the transliteration competence of personal names by Arabic native speakers on social media are given.

| KEYWORDS

Arabic-English transliteration, geminate transliteration, Arabic geminates, Arabic personal names, Facebook spelling, personal name transliteration, deletion strategies, addition strategies, transfer from Arabic, transliteration competence.

| ARTICLE INFORMATION

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1. Introduction

Transliteration[1] is the process of changing a word from the writing system of one language to another. It changes the letters (graphemes) from the word's original alphabet to similar-sounding letters (graphemes) in a different language. It helps people pronounce words and names in the foreign language. It does not give the meaning of the word that is written in another language, rather, it gives the reader an idea of how the word is pronounced.

In this day and age, transliteration of words and names from one language to another to Romanized script is very common and, in some cases necessary. It is commonly used in passports, airline tickets, insurance policies, medical reports, financial transactions, banking services, business letters, Arabic shop names, Arabic brand names, street names, city names, landmarks and others. With the extensive use of social media by people of different age groups, educational levels, and proficiency levels in English, many

[1] https://www.vocabulary.com/dictionary/transliteration

users choose to transliterate their names to English. This is noticeable on Arabic pages on social media such as Facebook, Twitter, and Instagram where many Arab users choose to transliterate their names to English.

Being a widespread phenomenon, transliteration of Arabic words, such as proper nouns, to English has been the focus of research for more than a century. As early as 1917 and 1930, DC & ARH (1917) and Brux (1930) examined the transliteration of Arabic names for the I/M Map and Arabic-English transliteration for library purposes respectively. A plethora of recent studies in the literature focused on Arabic to English machine (computer) transliteration and improvements that can be made using different models such as combining probability models, web mining and statistical models. Some of those studies focused on setting up a framework for proper name transliteration (Zhou, Huang & Chen (2008); the transliteration of proper names across-language applications (Virga & Khudanpur, 2003); the nuisances in the Arabic Romanization and transcription schemes (Gorgis, 2010); a sequence-to-sequence-based approach to the double transliteration of the Tunisian dialect (Younes, Souissi, Achour & Ferchichi, 2018); using the transliteration of proper names from Arabic to Latin script to improve English-Arabic word alignment tools (Semmar & Saadane (2013); the transliteration of person names from Arabic to English using data mining from Twitter for the purpose of building transliteration resources and systems (Mubarak & Abdelali, 2016); the problems of identifying Arabizi (Arabic text written in Latin characters) in a text and converting it to Arabic characters (Darwish, 2013) and many more. Other studies in the literature indicated that transliteration systems are inconsistent, inappropriate, and unsystematic. For those reasons, Saudi Academics and legal authorities held two symposia in 2003 and 2006 to standardize the transliteration of Arabic proper names to the English alphabet and the transliteration of foreign proper names to the Arabic alphabet. These resulted in a transliteration table and algorithms. Based on those outcomes, software was developed and is being used by different agencies and institutions in Saudi Arabia (Alghamdi, 2009).

It can be concluded from the above prior studies that the transliteration of Arabic words to Romanized (English) script is problematic and inconsistent because of the differences between the Arabic and English phonological and orthographic systems. Some consonants exist in Arabic but not in English such as ح خ ص ض ط ظ ع غ ق /H, x, S, D, T, DH, ʕ, gh, q/. Arabic has 3 short vowels /a. u. i/ and 3 long vowels /a:, u:, i:/, and 2 diphthongs /ay, aw/ as opposed to 12 vowel phonemes /i/, /ɪ/, /e/, /ɛ/, /æ/, /u/, /ʊ/, /o/, /ɔ/, /ɑ/, /ə/, /ʌ/, and 8 diphthongs /eɪ/, /oʊ/, /aʊ/, /ɪə/, /eə/, /ɔɪ/, /aɪ/, /ʊə/ in English. In some cases, English has more than one grapheme that corresponds with a single phoneme as in *clean, receipt, need, be, delete* and one grapheme may correspond with different phonemes as *ou in court, country, count, courage, bought, our, house, coup* (Al-Jarf, 2003; Al-Jarf, 1994a; Al-Jarf, 1994b; Al-Jarf, 2019; Al-Jarf, 2008b).

A prominent feature of the Arabic phonological system is gemination. In Arabic, geminates or double consonants occur within a word in medial and final positions. Gemination is shown by a diacritical mark, not double consonants spelled together. On the contrary, English has no geminates within the word even when words contain double consonants such as *account, communication, assessment, approval, arrival,* the double letters are pronounced as a single phoneme. Gemination occurs across word boundary as *irrelevant, immoral, unnatural illegal, that time* and others (Al-Jarf, 2022).

Being a distinctive feature of Arabic, gemination has been the subject of numerous studies in the Arabic language literature. For example, Ghalib (1984) conducted an experimental study to examine single/geminate contrasts in Iraqi Colloquial Arabic to distinguish long, double and geminate consonants. He found that duration is the overriding factor in distinguishing a geminate from a single consonant, both perceptually and productively. He found little or no evidence for 'rearticulation' in the production of geminated consonants; and no compensatory adjustment in the vowel duration in vowels that precede the two types of consonants in word-medial position. Other studies in the Arabic literature investigated the phonetic and phonological patterns of gemination in a particular Arabic dialect such as: Phonetic and phonological patterns of gemination in Lebanese Arabic and on the temporal relationship between geminate consonants and vowel length (Khattab, 2007; Khattab & Al-Tamimi, 2008); phonetic and phonological aspects of gemination in Libyan Arabic (Issa, 2016); phonological and morphological patterning of geminates in Moroccan Arabic (Noamane, 2020; Noamane, 2021); the phonetics and phonology of assimilation and gemination in rural Jordanian Arabic (Al-Deaibes, 2016); the interaction of stress, syllable structure, and gemination in Jordanian Arabic (Al-Tamari, 2000); the acoustic and articulatory features of gemination as pronounced by Algerian speakers and the values of frequency formants, energy and durations of the consonants and subsequent vowels in the various [VCV] and [VCgV] utterances (Ferrat & Guerti, 2017); geminates and prosodic length or as prosodic weight in rural Jordanian Arabic (Al-Deaibes, 2021); doubling of consonants in Arabic as a morphological issue, which changes the derivational class and the semantics of the verb (El Zarka, 2005); Arabic emphatic gemination in nouns and verbs (Mugair, 2017); the gemination effect on consonant and vowel duration in Standard Arabic speech (Trigui, Maraoui & Zrigui, 2010); a clinical phonetic study of Jordanian Arabic final geminates, whether gemination occurs in word-final position, and whether there is a temporal compensatory relationship between the vowels preceding geminate/singleton consonants (Al-Tamimi, Abu-Abbas & Tarawnah 2010).

The above literature review on the problems of machine transliteration of Arabic words to Romanized script (English) and the phonetic and phonological patterns of gemination has shown lack of studies that explore how humans transliterate words from Arabic to English script. Therefore, this study aims to fill a gap in this area by exploring how Arabic native speakers transliterate their names on social media to English and what transliteration anomalies exist. Specifically, this study aims to examine a sample of English transliterations of Arabic personal names by native speakers of Arab on Facebook to find out the percentage of Arabic names in which geminates were transliterated to double letters correctly; the percentage of Arabic names in which geminate consonants were reduced to a singleton consonant; and the percentage of names where a singleton consonant is doubled.

The study will only focus on Arabic personal names that contain a geminate in their spoken form and names spelled with double consonants in their written English form on Facebook as produced by Arab users themselves. Results of the study will reveal the orthographic and phonological weaknesses that Arabic-native speakers have in converting their own names from Arabic to English script on Facebook and causes of transliteration anomalies, i.e., why they double certain consonants in certain names and reduce double consonants from a geminate in others.

2. Definition of Terms

Arabic is a right-to-left alphabetic language. It has 25 consonant and 3 long vowel letters (See Table 1), in addition to 14 diacritical marks in the Arabic orthographic system that include three short vowels (See Image 1). Each consonant letter has a detached form and one to four attached forms. Letters are attached together to make words and diacritics are placed on top or underneath a consonant letter. One of the important diacritics in the gemination diacritic (shadda شدة ّ) which is placed on top of a single consonant to show that there is a double consonant even though one consonant is spelled. Here the geminated consonant is lengthened and doubled (Al-Jarf, 2007a).

Table 1: The Arabic Alphabet in Arabic Script and Phonetic Alphabet

ء	ي	و	ه	ن	م	ل	ك	ق	ف	غ	ع	ظ	ط	ض	ص	ش	س	ز	ر	ذ	د	خ	ح	ج	ث	ت	ب	ا
’	y	w	h	n	m	l	k	q	f	gh	‘	ẓ	ṭ	ḍ	ṣ	sh	s	z	r	dh	d	kh	ḥ	j	th	t	b	’

Image 1: Arabic Diacritics with Examples[2]

Diacritical Marks التَّشْكِيْل				
Tanween with *Shaddah*	*Tanween* تَنْوِيْن	Short vowels with *Shaddah* شَدَّة	Short vowels	
ـًّ	ـً	ـَّ	ـَ	*fatHah* فَتْحَة
ـٍّ	ـٍ	ـِّ	ـِ	*kasrah* كَسْرَة
ـٌّ	ـٌ	ـُّ	ـُ	*DHammah* ضَمَّة
		ـّ	ـْ	*sukuun* سُكُون

In the early stages of reading development, Arab children learn to decode the Arabic language in kindergarten and the first three grades, and they learn to decode with the diacritics written on top or underneath the letters. Their textbooks are usually fully marked with all the diacritics. When they master the Arabic decoding skills and associating the written form of the words (graphemes) with their spoken form (phonemes) and vice versa, they start to decode words without the diacritical marks. Although words are fully marked with all the diacritics in the Holy Quran and the Prophets' Traditions (Hadith), words in Arabic books, newspapers, magazines, T.V., social media and linguistic landscapes are normally shown without the diacritical marks. Arabic speakers read, write and spell words without the diacritical marks. They read and spell words with geminates even though they are spelled with a single consonant but pronounced as a geminate (double or long consonant). Arab students and adults have no problem reading words that have the same consonants but differ in the diacritics on top of each consonant. They can tell whether a cpnsonant in a word is geminated or not and how a word without diacritics is pronounced with different short vowel sounds from context (Al-Jarf, 2018; Al-Jarf, 2007a; Al-Jarf 1995; Al-Jarf, 1992).

[2] https://blogs.transparent.com/arabic/basic-arabic-diacritical-marks/

Moreover, Arabic is diaglossic, i.e., it has a Standard Arabic form and a Colloquial spoken form (Colloquial Arabic). Each Arab country has its own dialect (Colloquial) form and several sub-dialects in the different regions within each country. Phonological, lexical and syntactic differences exist between the Standard Arabic and the dialects and between the different dialectics. From birth to school age, children are exposed to the Colloquial form at home and to the Standard form on T.V. (cartoon films) and children's books (Al-Jarf, 2021).

Regarding the English Alphabet, it has 21 consonant letters and 5 vowel letters (See Image 2). Unlike Arabic, English has no diacritics. English has numerous dialect, such as American, Canadian, British, Australian and others which also have phonological, lexical and syntactic differences.

Image 2: The English Alphabet with Phonetic Transcription

A	a	—	[ei]	N	n	—	[en]
B	b	—	[bi:]	O	o	—	[ou]
C	c	—	[si:]	P	p	—	[pi:]
D	d	—	[di:]	Q	q	—	[kju:]
E	e	—	[i:]	R	r	—	[a:(r)]
F	f	—	[ef]	S	s	—	[es]
G	g	—	[ʤi:]	T	t	—	[ti:]
H	h	—	[eitʃ]	U	u	—	[ju:]
I	i	—	[ai]	V	v	—	[vi:]
J	j	—	[ʤei]	W	w	—	[dʌblju]
K	k	—	[kei]	X	x	—	[eks]
L	l	—	[el]	Y	y	—	[wai]
M	m	—	[em]	Z	z	—	[zed]

A comparison of the Arabic and English sound systems showed that Arabic has consonant phonemes that do not exist in English (ح خ ص ض ط ظ ع غ ق H, x, S, D, T, ʕ, q, gh, DH,) and English has consonant phonemes that do not exist in Arabic /g, ʧ, ʒ, ŋ/ (Al-Jarf, 2003; Al-Jarf, 1994a; Al-Jarf, 1994b). English and Arabic vowels differ in number, length, quality, and position of the tongue and lips.

In Addition, there are differences in geminated consonants in both languages. Although many English words are spelled with double consonant letters such as *arrive, attack, assess, announce, connection, collection, comment, commence, communication, correct, corrupt*, happen, *differ, difference, copper*, those double consonants are pronounced as single consonant phonemes. This means that in English, gemination never occurs within a word even if a word is spelled with double consonants. It only occurs across word boundary, i.e., at the junction of words *as in 'that time', 'big gun', 'immoral', 'illegal'; but not in 'essay'*, or '*announce*'.

On the contrary, geminates (long consonants) occur very frequently in Arabic. They are obligatory in Arabic and occur in word medial and word final position, as in ʕ*adda 'counted', mahhada 'paved the way'; kattaba* 'made someone write'. In written Arabic, gemination is shown by a diacritic (*ḥaraka*) called شَدَّة *shadda* ّ written above the consonant letter that is geminated, i.e., instead of writing the same consonant twice. The *shadda* disambiguates words that differ only in the doubling of a consonant where the word is not clear from the context. For instance, it is sometimes used to distinguish مدرّسة *mudarrisa "female teacher"* from مدرسة *madrasa "school"* (Al-Jarf, 2003; Al-Jarf, 1994a; Al-Jarf, 1994b).

3. Data Collection and Analysis

A sample of 406 English transliterations of Arabic personal names on Facebook was collected from the author's list of 4000 friends. All names on the English list were transliterated by educated Arabs, such as students, teachers, layers, doctors, computer scientists and other professionals. The subjects come from different Arab countries and regions, have different educational levels and different proficiency levels in English.

Personal names spelled in the Arabic alphabet were deleted. Arabic names transliterated by non-native speakers of Arabic, such as Malaysians or any other nationalities that use Arabic names were not included in the sample. Names of foreign friends from Europe, USA, Japan, China and others, those written in other alphabets such as French or Russian, Uzbek, Bosnian, Hindi, Thai, or Vietnamese, initials and abbreviations *(Mhmd, Moh, Ab),* nicknames *(Sunnygirl*), duplicate names were excluded. Only Arabic personal names transliterated to English letters were compiled. Focus is on Arabic personal names that contain geminates (double consonant) whether the English transliteration contains double letters (bb, cc, dd, ff, gg, jj, kk, kk, ll, mm, nn, pp, rr, ss, tt, zz, yy) or singleton consonants were extracted and subjected to further analysis. Transliteration anomalies of other phonemes such as vowels, consonants that do not exist in English or compound personal names are not the focus of the current study.

In analyzing the English transliterations of Arabic personal names, the first name and the last name of the same person were classified as two tokens, not one. If there are two graphemes with double consonants within a single first name or surname, they are counted as 2 tokens of geminates.

To find out the strategies used in transliterating geminates in Arabic names to English, English transliterations were classified as follows: (i) Correct transliterations where an Arabic geminate was transliterated by a double consonant in English; (ii) addition where a consonant was doubled (added) in the English transliteration although the Arabic name has no geminated consonant; (iii) deletion where an Arabic geminate was represented by one consonant in the English transliteration, although it should be represented by double consonants in English, i.e., a single consonant rather than a double consonant is used. Frequencies of transliterations in the correct, addition and deletion categories were calculated.

4. Results

Table 2 shows the percentages of the correct transliterations, and the deletion and addition strategies used by native speakers of Arabic in transliterating names with geminates to English on Facebook. Results in Table 2 show the following:

1) 33% of the Arabic personal names were transliterated correctly, i.e., the geminated consonant in Arabic was represented by a double consonant in English as in compound names containing -Allah (*Abdallah, Abdullah, Atalla, Awadallah, Gadallah, Noorallah, Bendifallah*) and those containing -ddin (*Ala'addin, Fakarddin, Noureddin). Other* names that were transliterated correctly are *Attayb, Azza, Ezz, Exxat, Hammad, Bassam, Hassouna, Elnaggar, Mekky, Hammouda, Khattab, Muharram, Mohanned, Metwally, Nassar, Algammal, Alqattan, Allam, Haggag, Gassan, Abbasi*. The correct English transliteration may be due to the users' good proficiency level in English and their knowledge of geminates in Arabic and their representations in English, i.e., grapheme-phoneme correspondences.

2) In 41% of the transliterations, a consonant was deleted from the geminate, i.e., the geminate was reduced to a single consonant as in: *Amouna, Amool, Elzahar, Hamam, Elnagar, Sedeek, Fatouh, Elsayed, yousreya, Sayed, Zulfiya, Mothana, Atia, Elzahraa*. Reduction of Arabic geminates to a single consonant in the corresponding English transliterations was also noted in surnames that begin with the definite article /al/, especially when followed by *the "sun letters"* الحروف الشمسية / t, d, θ, ð, n, r, z, s, ʃ, S, D, T, DH/**.** Here, the /l/ is deleted from the definite article and the following consonant is geminated due to assimilation). But since geminated consonants are represented by one consonant and the diacritic shadda is not shown in the Arabic spelling commonly used by literate Arabs, this was transferred to the corresponding English transliteration as in the surnames *El Shafay, Elshafey, Alshaikh, Alsheikh, Alshekh, Alshekh, Alshareef, Alshiref, Alshirif, Alshreef, Alshrif, Elsayed, Elsebaee, Elshebiny, Elzahar, Elsabagh, Elsokary*. Here Facebook Arab users transliterated their surnames the way they spell them in Arabic, i.e., with the definite article attached to the name followed by a single geminated consonant. The same strategy was applied to some Arabic compound surnames such as *Abuelsooud (Abu+ el + sooud).*

   Although names that begins with sh after the definite article should be geminated (spelled with the double consonant shsh), it would look awkward as double shsh never occur in English words, i.e., non-existent in the English grapheme-phoneme correspondence rules. So in this case it would be better to spell it with a single sh taking into consideration the.

3) In 26% of the English transliterations, a consonant was added to an existing consonant, thus forming a geminate (double consonants) although the Arabic personal name is pronounced with a single consonant phoneme not a geminate as in *Ahmmed, Anass, Assad, Assem, Attia, Bassim, Bassiouni, Eissa, Issa, El Dessouky, Elalla, Elhassib, Elhusseniy, Elqassaby, Enass, Essam, Essraa, Gehadd, Hassan, Hessien, Hossam, Hossen, Houssaini, Hussain, Hussam, Hussein, Isslam, Mohssen, Nasser, Nessrin, Ossama, Quassem, Sammar, Wissam, Yasser, Yassin, Youniss.* Anomalis with double ss constitute 23% of the tokens in the data.

   Interestingly, an Arab user transliterated his first name *Mmdoh* with mm in word-initial position, although this is counter-intuitive, as gemination in Arabic never occurs in word initial position. Another user transliterated his name *Isslam* with ss, although the word *Islam* with which most people are familiar, is never spelled with ss. Arabic speakers usually spell it with a single s. A couple of Arabic speakers spelled *Ahmmad and Alli* with mm and ll although these Arabic names are very common, and the majority of people spell them with a single m and l.

   Sometimes the doubling of a consonant in a name can create confusion between two names that have the same transliteration in English but have two versions of the same name in Arabic: One with the geminate ss and one with a single s. When *Hassan* is spelled with double ss, this will create confusion between حسّان and حسن. Therefore, حسن should be spelled with a single s and حسّان with double ss.

4) Data analysis revealed variant transliterations of the same name such as *Mohammad, Mohammed, Muhammad, Mhamed, Muhamad, Mohmad, Mohmed, Mohamad, Mohamed*. Of a total of 153 tokens, only 29% were spelled with mm and 71% were spelled with a single m. Those who spelled Mohammad with a single m are transferring the Arabic spelling of the word محمد which is spelled with a single m and the gemination diacritic shadda ّ which is usually assumed, but not written. On the contrary, those who spelled it with a single m are transferring the Arabic spelling which contains a single m to English, not paying attention to the fact that the single s in the Arabic spelling is geminated.

Table 2: Percentages of Transliteration Strategies Used by Native Arabic Speakers of Facebook

Transliteration Strategies	Frequency of responses	Percentage
Deletion	168	41%
Addition	105	26%
Correct	133	33%
Total	406	

5. Discussion

Since gemination means doubling of consonants to Arabic speakers, they transferred the geminated consonant sounds from Arabic to the English transliteration. The deletion/reduction errors in this category show that Arabic native speakers in the current study have difficulties figuring out how their names are pronounced in their transliterated version. This is similar to the pronunciation mistakes that educated Arabs make when they geminate in some English proper nouns that contain double letters as in *Morocco, Nutella, Holland, Marshmallow, Penicillin, Elissa, Peking; Venezuela, Minnesota, Belarus, Toyota* (Al-Jarf, 2022; Al-Jarf, 2005a, Al-Jarf, 200b).

The reduction of Arabic geminates to a single consonant in the English transliteration of Arabic names by Arabic speakers in the sample is consistent with findings of a study by Miceli, Benvegnu and Carmazza (1995), who found that deletion of geminates by L1 students occurred 10 times more often than the deletions of a consonant in a non-geminate cluster. Bardine (1997) also found that children and adult literacy students generally learnt and understood single beginning and end consonants before they could master double consonants or consonant clusters in L1. Similarly, the reduction of geminates was a common strategy used in spelling English words by EFL college students as in *midle* instead of *middle*. Reduction of double consonants constituted 19% of the graphemic errors in spelling English words by L2 students (Al-Jarf, 2019; Al-Jarf, 2010; Al-Jarf, 2009; Al-Jarf, 2008a; Al-Jarf, 2007b; Al-Jarf, 1999).

In doubling the ss in the English transliteration of Arabic names, the subjects are probably connecting the s with the multiplicity of English words containing ss with which the subjects are familiar as in *access, assess, confess, chess, witness, class, cross, grass, glass, dress, impress, less, mess, miss, kiss, boss, pass, guess, stress, address, discuss, express, illness, success,* and others. Therefore, some Arabic speakers are probably assuming that any Arabic name with an s should be transliterated with double ss in English.

Moreover, Arab transliterators on Facebook do not seem to know the circumstances under which a geminate in English and Arabic occurs and that an English word spelled with a single or double consonants within a word does not affect its pronunciation, i.e., words with double consonants in English are pronounced as a single consonant (A-Jarf, 2008c).

Regarding the spelling of *Hussein* and its variants with double ss, this is probably because the late King Hussein of Jordan used to spell his name with double ss. So Arab transliterators are doubling the ss in their names imitatively.

6. Recommendations

Native-Arabic speakers on Facebook seem to have difficulties in transliterating Arabic names with geminates to English. They tend to reduce geminates to single consonants and tend to transliterate the same name in different ways. To minimize the variations and errors made in transliterating Arabic names to English, this study recommends raising EFL students' awareness of the differences between English and Arabic gemination in the English language courses that they take, how double consonants in English are pronounced and how Arabic geminated consonants should be transliterated (Al-Jarf, 2005a; Al-Jarf, 2005b).

Mind-mapping software can be utilized to show relationships among graphemes and their corresponding phonemes in a tree diagram, with examples of words with double consonants (Al-Jarf, 2011).

In addition, this study recommends the standardization of the English transliteration of Arabic personal names. Some studies in the literature built transliteration resources and systems of personal names from Arabic to English using data mining from Twitter (Mubarak & Abdelali, 2016). Similarly, Alghamdi (2009) developed software with transliteration tables and algorithms to

standardize the transliteration of Arabic proper names to the English alphabet and the transliteration of foreign proper names to the Arabic alphabet.

When social media users transliterate their Arabic names to English, the transliterated name should be easily read by both native speakers of Arabic who have some knowledge of English and English speakers who might read it in English as well. An experimental study can be conducted in which English speakers are asked to read variant transliterations of the same Arabic name such as *Mohammad, Mohammed, Muhammad, Mhamed, Muhamad, Mohmad, Mohmed, Mohamad, Mohamed; Eissa, Issa, Isa, Esa* and find out how they will pronounce each in order to choose the transliteration that best corresponds with the Arabic pronunciation of the name.

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