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| RESEARCH ARTICLE

Variant Transliterations of the Same Arabic Personal Names on Facebook

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| ABSTRACT

This study aimed to explore variant transliterations of the same Arabic names in English by Arabic native speakers on Facebook; to find the distribution of English variant transliteration of Arabic names; the types of variant transliterations produced by Arabic speakers; the strategies they utilize in transliterating their names to English; and the sources of the variations in the English transliteration of the same Arabic name. A sample of 112 names with a total of 332 variant transliterations and 1139 occurrences (repeats) was collected from the author's friends on Facebook. It was found that 59% of the Arabic names have 2 variant transliterations in English and 26% have 3 variants transliterations. Names with the highest number of variant transliterations are الجرف (35), محمد (7); يوسف محمود, شريف, (6); نور نورة شيماء (5). Variants with the highest occurrences are الجرف (154), محمد (153); احمد (90); Ali (67); محمود (53); هناء & السيد(19). In 97% of the names in the sample, the variants differ in how the vowels/diphthong are represented in the English transliteration because Arabic and English differ in the number of vowels, vowel quality and vowel articulation. Arabic has 3 long vowels, 3 short vowels and 2 diphthongs, whereas English has 12 vowels and 8 diphthongs. In transliterating their names, Arabic consonant sounds for which two English graphemes exist were spelled differently. There are variations in transliterating Arabic surnames with the Arabic definite article /al/. In 18% of the names in the sample, the subjects transferred the Arabic spelling to the English transliteration of their names. The short vowel was not represented in the English transliteration. In 15%, the subjects transliterated their names the way they pronounce them in their local dialect (*El-Garf* in Egypt; *Aljerf* in Syria and *Aljuruf* in Palestine), not as the name is pronounced in Standard Arabic. In 17%, the subjects with a background in French transferred the French phoneme-grapheme representations of vowels and consonants to the English transliteration (*Hicham, Aouatef*). The study gives some recommendations for the correct transliteration of Arabic names to English.

| KEYWORDS

Arabic-English transliteration, Arabic personal names, Facebook spelling, name transliteration, transliteration competence, variant transliterations.

| ARTICLE INFORMATION

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1. Introduction

Many users of social media from different countries and speaking different languages that use non-Latin orthography such as Arabic, Japanese, Chinese, Korean, Vietnamese, Thai, Russian, Uzbek, and others, choose to transliterate their first name and surname in Romanized script, vis English. Due to the differences between the user's native language and English in vowels, consonants and how they are pronounced, different people from the same language may transliterate the same first name and/or surname differently due to the user's proficiency level in English and their awareness level of the grapheme-phoneme correspondences in their native as well as English.

The transliteration of personal names from Arabic to Romanized script and from Romanized Arabic to Arabic script has been the major focus of research in the field of machine translation using different algorithms, automatic transliteration, transliteration modules and a variety of machine translation systems. Mammadzada, (2021) reviewed existing transliteration approaches and

methods for the correct writing of personal and place names which may be accurate in some cases, may not be significant for one language but not another. Those approaches are summarized below.

Studies that investigated the translation of named entities, such as names of people, organization and locations received more attention from researchers as they pose challenges in the translation task such as the emergence of newly named entities daily in newswire which complicates the translation task. Some names are translatable, some must be transliterated, and, others are mixed. To overcome the challenges of translating named entities across lingual information retrieval, machine translation, and other natural language processing applications, an integrated approach for named entity translation deploying phrase-based translation, word-based translation, and transliteration modules into a single framework was created by Awadalla and Sorensen (2005).

Similarly, Mostafavi Kashani (2007) proposed a spelling-based method for the automatic transliteration of named entities from Arabic to English which exploits various types of letter-based alignments. The method consisted of using single letter alignments, using alignments over groups of letters to deal with diacritics and missing vowels in the English output, and utilizing various knowledge sources to repair any remaining errors. Examination of the algorithm in the context of a machine translation task showed 88% accuracy.

Another solution to the named entities challenge was to build an automatically named entity lexicon for Arabic. Attia, Toral, Tounsi, Monachini and van Genabith (2010) adapted and extended the automatic Multilingual, Interoperable Named Entity Lexicon approach to Arabic, used the Arabic WordNet and Arabic Wikipedia. The researchers extracted Arabic WordNet's instantiable nouns and identified the corresponding categories and hyponym subcategories in Arabic Wikipedia. Then, they exploited the Wikipedia interlingual links to locate equivalents and similarities between articles in ten different languages in order to identify the Named Entities. They applied keyword search on Arabic Wikipedia abstracts to provide for Arabic articles that do not have an equivalent in any of the other languages. They performed a post-processing step to get Named Entities from the Arabic Wikipedia which were not reachable through the Arabic WordNet. The examined diacritization using matching with Geonames databases, MADA-TOKAN tools and different heuristics for restoring vowel marks in the Arabic Named Entities. They extracted about 45,000 Arabic Named Entities and built the largest, most well-structured and mature Arabic Named Entity lexical resource and organized and stored this lexicon following the ISO standard of the Lexical Markup Framework. Their framework achieved between 95.83% (with 66.13% recall) and 99.31% (with 61.45% recall) accuracy.

Further approaches used by machine translation researchers were the deep learning-based Sequence-to-Sequence approach which was devised to perform a word-level transliteration of the user generated Tunisian dialect on the social web, in both Arabic to Latin and Latin to Arabic senses (Younes, Souissi, Achour & Ferchichi, 2018). A substring-based approach to transliteration inspired by phrase-based models of machine translation was utilized by Sherif and Kondrak's (2007) who tested two implementations of a dynamic programming algorithm, and a finite-state transducer. Results showed that the substring-based transducer outperformed the letter-based approach and was also faster. A study by Kondrak, Li and Salameh's (2012) reported the results of transliteration experiments on English to Chinese, and Arabic to English using the syllable-based Pinyin intermediate representation for Chinese, and a letter mapping for Arabic.

To provide a computational solution to the transliteration problem of proper nouns from Arabic to English, a three-phase algorithm was introduced by Kashani, Popowich and Sadat (2006). The algorithm was based on a Hidden Markov Model approach, which leveraged information available in online databases. The algorithm showed 80% accuracy. Another tool for identifying the names of people from articles in the international press, capable of recognizing the different variants of the same name across languages and writing systems, including Arabic, Cyrillic and Greek was created. The researchers used a standard internal representation of each name and a single measure of similarity rather than taking the usual bilingual approach of transliteration. The module was part of a more general tool that analyzed an average of 15,000 newspaper articles each day, in order to group similar documents together, whether they were in the same or different languages (Pouliquen, Steinberger, Ignat, Temnikova & Widiger, 2005).

To combat the nuisances of conversion between Romanization and transcription schemes in the transliteration of Arabic, Gorgis (2010) created a Directory of Romanized Arabic Names to serve as an internationally recognized standard for Romanizing Arabic names. English native speakers participated in two elicitation tests: (i) recording the pronunciation of Romanized Arabic names appearing on the list which were agreed upon unanimously by a group of Arab experts. (ii) The same English-speaking informants were required to write down the name as they hear it said by an Arab speaker. In addition, the researcher sought to find out the systematic correlation between English sound patterns (phonemes) and letters (graphemes) which require the computation of corpora available in the International Corpus of English and American English data banks. They the researcher could verify the general patterns of appraisal gained from informants in the two tests and hence enable software developers to improve their programs accordingly.

Moreover, Kay & Rineer (2012) built a software system capable of transliterating and matching Arabic names across scripts using the DataFlux quality knowledge base. The software transliterates Arabic names written in the Arabic script to the Latin script, and transliterates Arabic names written in the Latin script to Arabic. Arabic name matching relies on a lexicon of Arabic names and their corresponding transliterations, which is based on phonetic transliteration rules for transliterating names into the Latin script. Ultimately, all names are rendered in the Latin script before matching takes place. Thus, this technology is capable of matching names across the Arabic and Latin scripts, as well as within the Arabic script or within the Latin script.

Since standard string comparison measures perform poorly on linguistic name matching in English and Arabic due to the varying transliteration conventions in both languages and the fact that Arabic script does not usually represent short vowels, Freeman, Condon and Ackerman (2006) proposed a solution to the problem of matching personal names in English to the same names represented in Arabic script. Significant improvements were achieved by augmenting the classic Levenshtein edit-distance algorithm with character equivalency classes.

In the above literature review, researchers made efforts to solve the problems of Arabic English transliteration using machine translation systems, algorithms and modules. However, there is a dearth of studies that investigate the difficulties/problems that Arabic native speakers have in transliterating personal names from Arabic to English on social media. A study by Al-Jarf (2022a) explored how Arabic native speakers transliterate personal names containing geminates to English on Facebook and what transliteration anomalies they produce. The study found that one third of the Arabic name tokens with geminates were transliterated correctly; in 41% of the name tokens, the geminate was represented by a single consonant and in 26% of the English transliterations, a single consonant was doubled.

Due to the dearth of studies that examine transliteration of personal names from Arabic to English by native Arabic speakers, this study seeks to explore the variations that Arabic native speakers produce in transliterating the same first name and/or surname on social media based on a sample of names collected from Facebook. Specifically, the study aims to: (i) compare the variant transliterations of the same first name and/or surnames; (ii) describe the distribution of English variant transliteration to Arabic names; (iii) identify the types of variant transliterations; (iv) explore the strategies that native speakers of Arabic utilize in their English transliteration variants of the same name; (v) find out why Arabic-native speakers produce each English transliteration variant based on a contrastive analysis of the English and Arabic phonological systems and grapheme-phoneme correspondences in both languages; (vi) define the sources of the variations in the English transliteration of the same name.

Unlike prior studies in the literature, the current study will examine how educated native-speakers of Arabic transliterate their first names and surnames from Arabic to English on social media without using any software, algorithm, or any machine translation system. It is a human-based Arabic-English transliteration. The sample of names in the current study is limited to those in the author's list of friends on Facebook. Other names that appear on Facebook in general are not covered by this study.

2. Definition of Transliteration

Transliteration refers to the conversion of words from the alphabet of one language to the alphabet of another without changing the pronunciation of the words. It is usually used in the context of machine translation and cross language information retrieval to deal with the issue of named entities and technical terms (Younes, Souissi, Achour & Ferchichi, 2018; Sherif & Kondrak, 2007).

3. The Arabic and English Orthographic Systems

Arabic has 25 consonant and 3 long vowel letters (See Table 1), in addition to 14 diacritical marks that include three short vowels (See Image 1). Diacritical marks are placed above or underneath a consonant letter.

In the early stages of reading development, Arab children learn to decode the Arabic in kindergarten through the first three grades where they learn to decode words with the diacritical marks written above or underneath the letters. All school textbooks are usually fully marked with all the diacritics. When the children master the Arabic decoding skills and are capable of associating the graphemes, i.e., the written form of the words, with the phonemes, i.e., their spoken form and vice versa, they start to decode words without the diacritics. Although words are fully marked with the diacritics in the Holy Quran and the Prophets' Hadith (Traditions), words in Arabic books, magazines, newspapers, T.V., social media and street signs 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 consonant 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).

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
ʾ	y	w	h	n	m	l	k	q	f	gh	ʿ	ẓ	ṭ	ḍ	ṣ	sh	s	z	r	dh	d	kh	ḥ	j	th	t	b	ʾ

Image 1: Arabic Diacritics with Examples[1]

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

Furthermore, Arabic is diaglossic, i.e., it has a Standard Arabic form that is used in formal situations and T.V. news and a Colloquial spoken form used in daily conversation with relatives and friends, when shopping and carrying out daily activities. Each Arab country has its own dialect (Colloquial) form and several sub-dialects in the different regions. Standard Arabic and the dialects have phonological, lexical and syntactic differences. Similarly, there are phonological, lexical and syntactic differences among the dialects spoken in the different Arab countries. Thus, the pronunciation of the same personal name might differ from dialect to dialect. From birth to school age, children are exposed to the local dialect at home and to Standard Arabic in children's books and on T.V. such as dubbed cartoon films (Al-Jarf, 2021).

As for English, it has 21 consonant letters and 5 vowel letters that are shown in Image 2. Unlike Arabic, English has no diacritics. English has numerous dialects such as British, American, Canadian, Australian and others and regional sub-dialects within each country 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 (ق غ ع ظ ط ض ص خ ح 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). Arabic and English vowels differ in number, length, quality, and position of the lips and tongue.

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

4. Data Collection and Analysis

A sample of 112 names with a total of 332 variant transliterations and a total of 1139 occurrences (repeats) of the same transliteration was collected from the author's 4000 friends on Facebook. All the first names and surnames were transliterated by educated native-Arabic speakers such as students, instructors, doctors, layers, journalists, computer scientists and others. The subjects come from different Arab countries (Jordan, Lebanon, Syria, Palestine, Iraq, Egypt, Tunisia, Libya, Tunisia, Algeria, the Sudan, Kuwait, Qatar, Bahrain, Oman, UAE, and Yemen) have different educational levels and different proficiency levels in English.

Names of foreign friends from the USA, Europe, Japan, China, and others, those written in other alphabets such as French, Bosnian, Hindi, Vietnamese, Thai, Russian, Uzbek, initials, and abbreviations *(Moh, Mhmd, Ab),* nicknames *(Sunnygirl*), and duplicate names were excluded. Arabic names transliterated by non-native speakers of Arabic such as Malaysians, Bosnians, Bangladeshi, Uzbek or any other nationality that uses Arabic names were not included in the sample. Only Arabic personal names transliterated to English graphemes were compiled and analyzed. Focus is on the variant transliteration of the same Arabic personal name to English. Other transliteration anomalies of vowels and consonants that do not exist in English, names with geminate consonants or compound names are not the focus of the current study.

In analyzing the variations in transliterating Arabic personal names to English, the first name and the surname of the same name were classified as two tokens, not one. Each variant transliteration of the same name was counted as a token. For example, a name with several transliterations such as Hassan and Hasan are counted as 2 tokens. If Hassan occurred 10 times in the sample, it is counted as 10 tokens (occurrences).

In anlyzing the variant transliteration data, it was noted that variant transliterations of a name might have one, two, or three differences. Therefore, in comparing the variants for the same names, vowel grapheme errors in each syllable were counted as 1 token. This means that vowel errors in the first syllable across 3 variant transliterations were counted as one error (not three), and those occurring in the second syllable of the name across the variants as one error (not three). Thus, the set of variants would have 2 vowel-grapheme errors (one for each syllable). Similarly, consonants with different graphemes such as K & Q; S & C ; f & Ph were counted as 1 error.

To describe the distribution of variant transliterations, the percentages of names having 2, 3, 4, 5 … etc. English transliteration variants, the mean, median and range of variant transliterations; names with the highest number of variant transliterations and those with the highest occurrences were calculated.

To find out the strategies used in the variant transliterations of Arabic names, English transliterations were classified as follows: (i) those that match the pronunciation of the name in the user's local dialect, not Standard Arabic; (ii) those in which a vowel is absent from the English transliterations as the corresponding Arabic spelling of the name contains a short vowel that is not shown in the spelling, i.e., transfer of Arabic spelling to English; (iii) variants where vowels are misrepresented due to the small number of Arabic vowels and larger number of English vowels as in confusing /e & i/ in spelling a name with the short vowel /i/ (كسرة); (iv) variant transliterations of surnames with the Arabic definite article /al/ which is usually attached to many Arabic surnames; (v) transfer of consonant and vowel representation from French.

5. Results

5.1 Distribution of English Variant Transliterations of Arabic Names

Data analysis of the English variant transliteration resented in Table 2 shows that the number of variants for each name in the sample are as follows: 112 names with a total of 332 variant transliterations and a total of 1139 occurrences (repeats) in the data. It was found that 59% of the Arabic names have 2 variant transliterations in English; 26% have 3 variant transliterations; 8 % have 4 variant transliterations and 7% have 5, 6, & 7 variant transliterations, in addition to 1 name that has 35 variant transliterations in English. Variant transliterations ranged between 2 and 154, with a Median of 5, and mean of 10. 19% of the variants have 2 occurrences; 17% have 3 occurrences; 17% have 4 occurrences; 9% have 5 occurrences; 7% have 6 occurrences; and 28% have 7, 8, 9, 10, 11, 12, 13, 14, 16, 19, 20 occurrences. Names with the highest number of variant transliterations are الجرف (35), محمد (7); محمود ,يوسف ,شريف, (6); نور نورة شيماء (5). Variants with the highest occurrences in the name data are: الجرف (154), محمد (153); احمد (90); Ali (67); محمود (53); هناء & السيد/سيد(19).

5.2 Description of the Variant Transliterations of Arabic Names

Examination of the English variant transliterations of Arabic names presented in Table 2 reveals the following strategies that Arabic-native speakers:

1) In 97% of the names in the sample, the variants differed in how the vowels and/or diphthongs were represented in the English transliteration. For example:

- The Arabic short vowels /i/ was represented by different vowels such as e (*Hichem, Hicham, Hesham, Hisham; Ebtisam, Ebtsaam, Ebtesam, Ebtsam; Ismail, Ismaeel, Ismael, Ismaeil, Esmail; Eisra, Israa, Esraa, Essraa; Ebrahim, Ibrahim, Ebrahem, Ibraaheem; Intesar, Antesar; Neven, Nevine*.
- The Arabic short vowel /u/ was represented by ou, u, o in *Aljorf, Aljourf, AlJurf; Aljorof, Jurof, Aljuruf; Mona, Muna, Mouna; Hoda, huda; Mohmad, Muhamad; Mahmoud, Mahmud, Mahmood, Mahmoed; Hussein, Hussain, Hessien, Hossen, Hossein; Osama, Ossama, Ousama, Usamah; Murad, Morad; Boshra, Bushra;* Mostafa, Mustafa.
- The Arabic long vowel /aa/ was represented by "aa, a" as in *Adam, Aadam; Shaima, Shaimaa;*
- The Arabic long vowel /u:/ was represented by "u, ou, o, oo" as in *Yousef, Youssef, Yousuf, Yoosf, Yusoff, Yussif; Noura, Nora ; Noor, Nour; Musa, Mussa, Mousa, Moussa;*
- *The Arabic long vowel /i:/ was represented by "i, ee, ie, ei" in Alshareef, Alshrif,-Sharief; Rima, Reema, Reima; Amira, Ameera; Eid, Eed; Yasmin, Yasmine*.
- Final /i/ was represented either by y, ey or i as in *Amany, Amani; Hany, Hany; Helmy, Hlmey, Helmi; Samia, Samya*.
- The Arabic diphthong /ay/ was transliterated as "ai, ay, ie, ei, I" in *Shaima, Shaimaa, Shaymaa, Shimaa, Shiemaa; Alshekh, Alshaikh, Alsheikh; Zeinab, Zineb, Zainab*.
- The Arabic diphthong /aw/ was transliterated as *Aouatef, Awatef*;
- A vowel is absent from the English transliterations as the corresponding Arabic spelling of the name contains a short vowel that is not usually shown in the Arabic spelling, i.e., transfer of Arabic spelling to English. Here the subjects transferred the Arabic spelling in which the name contains short vowels for which the diacritics are not shown in the written form of name as in *Adm; Alshrif, Alshirif; Aljrf; Elgrf; Mhamed; Mhmoud; Alshreef, Alshrif; Yoosf; Ebtsaam, Ebtsam; Syed; Hlmey; Mmdoh; Adm; M'barek; Syed; Aml; Atia; Jneed; Makrm; Mhamed; Rshad; Sahr; Khloud*.
- Names with a diphthong or y after a vowel as in: *Faisal, Faysal Faisel; Zeinab, Zineb, Zainab; Ziiad, Ziyad; Mariam, Maryam; Samia, Samya; Shaima, Shaimaa, Shaymaa, Shimaa, Shiemaa; Attia, Atia*.
- Names with final h as in (عبد الله *Abdullah/Abdulla; Abdalla;* اسامة *Osama, Ossama, Ousama, Usamah;* حسناء *Hasnah, Hasna;* رابعة *Rabaa, Rab'ah;* سارة *Sara, Sarah;* فائزة *Faiza, Faizah*).
- Vowels after final glottal stop (hamza همزة) were spelled either with a single or doubble "a" as in (اسماء *Asmaa, Asma;* شيماء *Shaima, Shaimaa;* حسناء *Hasnaa, Hasna;* سناء *Sana, Sanaa;* هناء *Hanaa, Hana*.
- Names with vowels after the consonant /ʕ/ ع (اسماعيل *Ismail, Ismaeel, Ismael, Ismaeil, Esmail*; عصام *Essam, Issam, Isam*; عصام *Duaa, Dua'a, Doaa*; رفعت *Refaat, Refat*; سعيد *Saied, Saeed, said*; عيد *Eid, Eed*; عواطف *Aouatef, Awatef*; رابعة *Rabaa, Rab'ah*; ربيع *Rabea, Rabie*).

2) Arabic consonant sounds for which 2 English graphemes exist were spelled differently as in the following names:
   - Ch/sh (هشام Hichem, Hicham; أشرف Achraf; رشيد Rachid).
   - d/dh (Al Qudhah, Alqudah).
   - J/G (ماجدة *Magda, Majeda;* جيهان *Jihan, Gehan, Gihan;* جمال *Jamal, Gamal;* الجرف *Al Girf, Algarf, Al-Garf, El Garf, El Gorf, Elgarf, El-Garf, Elgorf, Elgrf, Elgurf, Garf, Gorf, Algref Al Jarf, Al Jorf, Al Jurf, Aljarf, Al-Jarf, Aljarv, Aljerf, Aljorf, Al-Jorf, Aljorof, Aljourf, Jurof, Al-Jourf, Aljrf, AlJurf, Aljurf, Al-Jurf, Aljuruf, Jerf, jorf, Jurf, ljarf)*.
   - k/g (صادق *Sadek, Sadig)*.
   - K/Q (تقوى *Takoua, Tqwa;* طارق*Tareq, Tarek*).
   - f/ph (مصطفى *Mostafa, Mustafa, Mostapha, Mustapha)*.
   - f/v (الجرف *Aljarv)*.

3) Adding or reducing geminates in the English transliteration. Reducing geminated consonants in the Arabic name which means that the English transliteration has one consonant, not double consonants. This is transfer from Arabic as Arabic uses a gemination diacritic which is not usually shown on top of the geminated consonant as in *Mhamed, Mohamad, Mohamed, Mohammad, Muhammad; Mahhmoud; Ahmmed; Youssef, Yusoff, Yussif; Mussa, Moussa; Essraa; Hussein, Hussain, Hessien, Hossen; Essam, Issam, Isam; Enass; Alli; Wissam; Attia; Yasser)*.

4) Forty three Arabic surnames in the sample contain the Arabic define article /al/, which is usually attached to many Arabic surnames. Here, 7 variant transliteraion in Enlgish were found as follows: (i) surnames with a deleted /al/ (Jurof, Garf, Gorf, Jerf, jorf, Jurf; Qudah); (ii) surnames with an attached /al/ as part of the word (الجرف *Algarf, Aljarf, Aljarv, Aljerf, Aljorf, Aljorof, Aljourf, Aljrf, Aljurf, Aljuruf, Algref;* الشيخ *Alshekh; Alsayd, Elsayed, Alqudah; Alshareef*); ((iii) surnames with a detached /al/, i.e., as an independent grapheme /al/ (الجرف *Al Girf, Al Jarf, Al Jorf, Al Jurf, Al-Jourf;* القضاة *Al Qudah*); (iv)) surnames in which the /al/ and the name are hyphenated (الجرف *Al-Garf, Al-Jarf, Al-Jorf, El-Garf, Al-Jurf*); (v) a surname is which both /al/ and following names are capitalized (الجرف AlJurf); (vi) surnames in which the definite article is reduced, i.e., /a/ is deleted as in الجرف (ljarf) ; (vii) surnames in which the definite article is pronounced /il/ (الجرف *Elgrf, Elgurf*; السيد *El-Sayed*; الجرف *El Garf, El Gorf, Elgarf, Elgorf*) with variations in transliterating /i/ as mentioned the first 5 cases.

Table 2: Arabic Names with Their Variant Transliteration, Number of Variants and Total Occurrences

Arabic names	Examples of Variant transliterations	# of variants	# of occurrences
الجرف	Al Girf, Al Jarf, Al Jorf, Al Jurf, Algarf, Al-Garf, Aljarf, Al-Jarf, Aljarv, Aljerf, Aljorf, Al-Jorf, Aljorof, Aljourf, Jurof, Al-Jourf, Aljrf, Aljurf, Aljurf, Al-Jurf, Aljuruf, El Garf, El Gorf, Elgarf, El-Garf, Elgorf, Elgrf, Elgurf, Garf, Gorf, Jerf, Jorf, Jurf, Ljarf, Algref	35	154
محمد	Mhamed, Mohamad, Mohamed, Mohammad, Mohmad, Muhamad, Muhammad	7	153
محمود	Mahmoud, Mahmud, Mahmood, Mahhmoud, Mahmoed, Mhmoud	6	53
يوسف	Yousef, Youssef, Yousuf, Yoosf, Yusoff, Yussif	6	13
الشريف	Alshareef, Alshreef, Alshrif, Alshirif, Sheriff, Sharief	6	11
سيد/ السيد	Alsayd, Elsayed, Sayed, El-Sayed, Syed	5	20
شيماء	Shaima, Shaimaa, Shaymaa, Shimaa, Shiemaa	5	12
نورة/نور/نورية	Noura, Nora, Noor, Nour, Nouria	5	12
مصطفى	Mostafa, Mustafa, Mostapha, Mustapha	4	23
القضاة	Al Qudhah, Alqudah, Al Qudah, Qudah	4	13
إبراهيم	Ebrahim, Ibrahim, Ebrahem, Ibraaheem	4	12
اسماعيل	Ismail, Ismaeel, Ismael, Ismaeil, Esmail	5	8
اسامة	Osama, Ossama, Ousama, Usamah	4	8
حسين	Hussein, Hussain, Hessien, Hossen, Hossein	4	8
هشام	Hichem, Hicham, Hesham, Hisham,	4	5
موسى	Musa, Mussa, Mousa, Moussa	4	4
إسراء	Eisra, Israa, Esraa, Essraa	4	4
ابتسام	Ebtisam, Ebtesam, Ebtsaam, Ebtsam	4	4
أحمد	Ahmed, Ahmad, Ahmmed	3	90
علي	Ali, Aly, Alli	3	67
سعيد	Saied, Saeed, Said	3	13
أمل/آمال	Amal, Amaal, Aml	3	12
إسلام	Eslam, Islam, Isslam	3	11
دعاء	Doaa, Duaa, Dua'a	3	10
ايمان	Iman, Eman, Eiman	3	9
إيناس	Ines, Enas, Enass	3	8
دعاء	Duaa, Dua'a, Doaa	3	7
ريما	Rima, Reima, Reema	3	6
زيد	Zaid, Zayd, Zaied	3	5
سناء/ثناء	Sana, Sanaa, Thanaa	3	5
رؤى	Roaa, Roua, Roa'a	3	5
حلمي	Helmy, Hlmey, Helmi	3	5
زينب	Zeinab, Zineb, Zainab	3	4
زهرة/زهراء	Zehra, Elzahraa Zahra	3	4
منير	Mounir, Munir, Monir	3	4
لبنى	Loubna, Lubna, Lobna	3	4
حسام	Hussam, Husam, Hossam	3	4
آدم	Adam, Aadam, Adm	3	4
رولا	Roula, Rula, Rola	3	3
رهام	Riham, Reiham, Rehaam	3	3
ممدوح	Mmdoh, Mamdoh, Mamdouh	3	3
حسناء	Hasnaa, Hasnah, Hasna	3	3
فيصل	Faisal, Faysal Faisel	3	3
عصام	Essam, Issam, Isam	3	3
الشيخ	Alshekh, Alshaikh, Alsheikh	3	3
عبد الله	Abdullah, Abdulla, Abdalla	3	3

طارق	Tariq, Tareq, Tarek	3	3
هناء	Hanaa, Hana	2	19
خالد	Khaled, Khalid	2	16
علاء	Alaa, Rajaa	2	14
هاني	Hani, Hany,	2	11
أماني	Amani, Amany	2	11
فاطمة	Fatima, Fatma	2	10
عمرو	Amr, Amro	2	10
أميرة	Ameera, Amira	2	10
أسماء	Asmaa, Asma	2	9
سلوى	Saloua, Salwa	2	8
سارة	Sara, Sarah	2	7
رشيد	Rachid, Rashed	2	7
خلود	Khloud, Kholod	2	7
هبة	Heba, Hiba	2	7
ياسر	Yaser, Yasser	2	6
وليد	Walid, Waleed	2	6
سليمان	Slimane, Soliman	2	6
سحر	Sahar, Sahr	2	6
فتحي	Fathi, Fathy,	2	6
أشرف	Achraf, Ashraf	2	6
ولاء	Walaa, Wala	2	5
منى	Mouna, Mona	2	5
جيهان	Jihan, Gehan, Gihan	2	5
جمال	Jamal, Gamal	2	5
هدى	Hoda, Huda	2	5
أنور، أنوار	Anwar, Anwaar	2	5
عالية	Aliaa, Alia	2	5
يحيى	Yahya, Yahia	2	4
وفاء	Wafaa, Wafa	2	4
صالح	Saleh, Salih	2	4
صادق	Sadek, Sadig	2	4
رفعت	Refaat, Refat	2	4
رأفت	Raafat, Rafat	2	4
ماجدة	Magda, Majeda	2	4
عطية	Attia, Atia	2	4
زياد	Ziiad, Ziyad	2	3
ورسام	Wissam, Wesam	2	3
سامية	Samia, Samya	2	3
رشاد	Rshad, Rashad	2	3
رباب	Rabeb, Rabab	2	3
مريم	Mariam, Maryam	2	3
مكرم	Makram, Makrm	2	3
الياس	Ilyas, Elyas	2	3
اكرام	Ikram, Ekram	2	3
عاطف	Atef, Atif	2	3
ياسمين	Yasmin, Yasmine	2	2
تيتو	Tetoo, Tito	2	2
تقوى	Takoua, Tqwa	2	2
سيرين	Seren, Sereen	2	2
رائد	Raid, Raed	2	2
ربيع	Rabea, Rabie	2	2

رابعة	Rabaa, Rab'ah	2	2
نيفين	Neven, Nevine	2	2
نوال	Nawal, Nawel	2	2
مراد	Murad, Morad	2	2
مبارك	Mubark, M'barek	2	2
جنيد	Juneid, Jneed	2	2
انتصار	Intesar, Antesar	2	2
هاشم	Hashim, Hashem	2	2
حسن	Hasan, Hassan	2	2
فايزة	Faiza, Faizah	2	2
عيد	Eid, Eed	2	2
بشرى	Boshra, Bushra	2	2
عواطف	Aouatef, Awatef	2	2
عفاف	Afaf, Afef	2	2

5.3 Causes of Variant transliterations

Results of the data analysis revealed that in 97% of the names in the sample, the variants differed in how the vowels and/or diphthongs were represented in the English transliteration. This result reflects lack of mastery of the English vowel system, and how an Arabic vowel should be transliterated to English. This is because Arabic and English differ in the number of vowels, quality of vowels and vowel articulation. Arabic has 3 long vowels, 3 short vowels and 2 diphthongs, whereas English has 12 vowels phonemes and 8 diphthongs. The subjects misrepresented the vowels and diphthongs due to the small number of Arabic vowels and a larger number of English vowels as in confusing /e & i/ in spelling a name with the short vowel /i/ كسرة. When Arabic speakers spell words in English, they depend on how a letter is names not how it sounds. Being irregular compared to Arabic in which there is one spelling for a name and vowels and diphthongs are pronounced the same in the vast majority of words, Arabic speakers get confused with English in which different vowel graphemes have the same pronunciation in different words as in *repeat, need, receipt, be, machine, believe, serene*, and the same vowel/diphthong grapheme can have different pronunciations in different words as in *group, court, found, country, courtesy, pour*.

In 18% of the names in the sample, the subjects transferred the Arabic spelling to the English transliterations of their names. Arabic names with short vowels have an English transliteration with a missing vowel as Arabic short vowels are not shown in Arabic orthography, i.e., Arabic speakers transferred the Arabic spelling to English as in *Aljrf; Elgrf; Mhamed; Mhmoud; Alshreef, Alshrif; Yoosf; Ebtsaam, Ebtsam; Syed; Hlmey; Mmdoh; Adm; M'barek; Syed; Aml; Atia; Jneed; Makrm; Mhamed; Rshad; Sahr; Khloud*.

In 15% of the names, the subjects transliterated their names the way they pronounce their name in their own local dialect , not as they pronounced in Standard Arabic as in the following examples: *Al Girf, Elgarf, Elgorf, Elgrf, Elgurf, Algarf, Al-Garf* (in Egypt), *Al Jarf* (in Saudi Arabia), *Al Jorf, Al Jurf, Aljorf Al-Jourf, Aljurf, Aljourf, Al-Jurf*, (in Jordan); *Aljorof, Aljuruf* (in Palestine); *Jerf, Ijarf, Aljerf, Aljrf* (in Syria); *Alshirif* (in Egypt), *Alshareef* (other Arab countries); *Yousef , Yussif* (CA), Yousuf SA); *Mhamed* (CA), Mohamad, Muhammad (SA); *Hichem, Hicham* (Tunisian), *Hesham, Hisham* (Other countries) ; *Hasnaa* (SA), Hasna (CA); *Zeinab, Zineb, Zainab* (SA); Mubark, M'barek; Magda (Egyptian), Majeda (other countries); Gehan, Gihan (Egyptian) Jihan (other countries); Sadek, Sadig (Sudan, Gulf States, Iraq); Slimane (CA), Soliman (SA); Fatima (SA), Fatma (Egyptian); Amr (SA), Amro (CA); Juneid (SA), Jneed (CA).

In 17% of the names in the sample, subjects from countries such as Tunisia, Algeria and Morocco, where French is learnt as a foreign/second language, transferred the French phoneme-grapheme representations of vowels and consonants to the English transliteration especially in ou & ch (هشام *Hichem, Hicham;* أشرف *Achraf;* رشيد *Rachid;* موسى *Moussa;* أسامة *Ousama;* لبنى *Loubna;* منير *Mounir;* عواطف *Aouatef;* اناس Enass; سلوى *Saloua;* تقوى *Takoua;* رباب *Rabeb;* منى *Mouna;* رلى *Roula;* عاطف *Afaf, Afef).*

6. Discussion

Findings of the present study show that the most transliteration problem that Arabic native speakers in the current study have problems in converting Arabic vowels to corresponding English ones. Since Arabic has 3 short vowels and 3 long vowels, each was transliterated with a variety of English vowels. This is similar to the errors that educated Arabs make when they mispronounce vowels and consonants in English proper nouns that contain vowels. Arab students changed phonemes and substituted them by a longer or shorter vowel as in *Dracula /dracola/, /gri:k/; Sergey Lavrov /sergi la:vro:v/; *snab shat, *Uzbakistan, *foks fagon, Ukraine /ʊkrɜ:rɪə/, /sinofa:rm/*. The Arabic pronunciation was retained and overgeneralized in *Ardoghan, *Anadol; *Athina*; *Eiffel Tower* /i:fəl/ or /i:vəl/. In addition, Arab students mispronounce English vowels in *London, Nixon, Moodle, Google, Uber*. They replace consonants absent in Arabic (p v) by their equivalents (*jafa, bebsi*). They pronounce words the way they are spelled (*Wednesday, Hyundai Nazi, Huawei, Nike*). Pronunciation errors made by Arab students can be attributed to transfer from Arabic, insufficient

mastery of English pronunciation rules, lack of knowledge of the differences between English and Arabic phonology, phonics, and phone-grapheme correspondences (Al-Jarf, 2022b; Al-Jarf, 2022c; Al-Jarf, 2005a, Al-Jarf, 2005b).

Similarly, the vowel transliteration errors that Arabic native speakers have in converting Arabic names to the English alphabet are consistent with the problems that Arab students have in spelling English. Arab students had difficulty in grapheme-phoneme correspondence such as their inability to discriminate English vowel phonemes. They mostly had graphemic-problems with vowel digraphs (*cheepest*), silent vowels (*relativs*), homophones *(whole, hall*)), silent digraphs (*neaght* instead of *neat*) (Al-Jarf, 2019; Al-Jarf, 2011a; Al-Jarf, 2010; Al-Jarf, 2009; Al-Jarf, 2008a; Al-Jarf, 2008b Al-Jarf, 2007b; Al-Jarf, 2007c; Al-Jarf, 1999).

Moreover, Arab transliterators on Facebook do not seem to know the differences between English and Arabic vowels and which English vowel corresponds with an Arabic short or long vowel and that short vowels in Arabic names that are represented by diacritical marks should be represented by a vowel in the English transliteration even if the diacritics are not shown in the written form of Arabic names (A-Jarf, 2008c; Al-Jarf, 1994a; Al-Jarf, 1994b).

Regarding the 35 English transliterations of the surname الجرف, this is because الجرف is the name of a tribe that extends across Arab countries such as Egypt, Yemen, Jordan, Palestine, Syria, Lebanon, Saudi Arabia, and UAE. Each of those countries has it own regional dialect and sub-dialects within the different regions of each country. As a result, الجرف has variant pronunciations in the different countries and regions which affect the transliteration of the name to English.

6.1 Recommendations

Native-Arabic speakers on Facebook seem to transliterate the same Arabic name to English in a variety of ways. They tend to use different English vowels and diphthongs to represent the same Arabic vowel in a name. To minimize the variations in transliterating Arabic names to English, this study recommends raising EFL and translation students' awareness of the differences between English and Arabic vowel systems in the English language, linguistics, phonology, and contrastive analysis courses that they take, how English vowels and diphthongs are pronounced in comparison with Arabic vowels and diphthongs and which English vowel corresponds to the 3 short and 3 long Arabic vowels (Al-Jarf, 2005a; Al-Jarf, 2005b). When teaching English and Arabic vowels, mind-mapping software can be utilized to show relationships among English and Arabic vowels and diphthongs and their corresponding phonemes in a diagram, with examples (Al-Jarf, 2011b).

Moreover, 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 English script and the transliteration of foreign proper names to Arabic script. To combat the nuisances of conversion between Romanization and transcription schemes in the transliteration of Arabic, a Directory of Romanized Arabic Names to serve as an internationally recognized standard for Romanizing Arabic names can be used (Gorgis (2010). A tool for identifying the names of people from articles in the international press, capable of recognizing the different variants of the same name across languages and writing systems, including Arabic, Cyrillic and Greek can be utilized as well (Pouliquen, Steinberger, Ignat, Temnikova & Widiger, 2005). In addition, Freeman, Condon, & Ackerman (2006) proposed a solution to the problem of matching personal names in English to the same names represented in Arabic script using the classic Levenshtein edit-distance algorithm with character equivalency classes.

When social media users transliterate their Arabic names to English, the transliterated name should be easily recognized and pronounced by both Arabic native speakers who have some knowledge of English and English speakers who might read it in English. Therefore, this study recommends the standardization of the English transliteration of Arabic personal names. An experimental study can be conducted in which English speakers are asked to read the variant transliterations of the same Arabic name and find out how they will pronounce each variant in order to choose the transliteration that best corresponds with the correct pronunciation of the Arabic name. The English transliteration that is closest in pronunciation to the Arabic pronunciation should be considered the standard transliteration. Facebook can be fed with those standard transliterations which can be used to prompt Arab users and suggest the correct English equivalents to their names when they create their Facebook pages.

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