Arabicization and Arabic Expanding Techniques Used in Science Lectures in Two Arab Universities

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ABSTRACT

The aim of this study is to observe directly the various Arabicization and Arabic expanding techniques which faculty members of two Arab universities (Jordan University of Science and Technology [JUST] in Jordan and the University of Damascus [UD] in Syria) employ in lectures when dealing with scientific terms. The researchers used an observation checklist to collect the needed data from a chosen sample. The results do not support the original hypothesis of the study since there were significant differences in how the JUST and the UD faculty members employed the above-mentioned techniques. It is evident from the results that Arabicization techniques were more frequently used in JUST than in the UD, and Arabic expanding techniques were employed more frequently in the UD than in JUST. This means that the usage of the Arabicized scientific terms in JUST is higher in frequency than in the UD, and the usage of the Arabic equivalents in the UD is higher in frequency than in JUST. In the light of the findings of the study, it is recommended that Arabic can cope with the new influx of scientific terms and that there are many inactive Arabic terms (or expressions) that can be revived and subsequently employed as equivalents to scientific terms in English. Finally, the researchers recommend that there should be open channels of communication among Arabic language academies to coordinate their efforts to unify and standardize the use of Arabic terminology in all fields.

KEYWORDS: Arabicization, Arabic expanding techniques, JUST, UD

INTRODUCTION

A language, as Alan Duff believes, may not always have satisfactory equivalents for a foreign term. Consultation with specialists, he asserts, is clearly the best solution. This is not always possible, however. Isidore Pinchuck admits this fact in his discussion of the "language barrier" by stating: "There will also be disparities on the lexical level, and most probably, one language will have no words for a concept expressed in the second language" (53). In recognition of this problem, John Catford reiterates that "but whereas it is nearly always possible to establish translation equivalence between sentences, it is often difficult to do so between lexical items" (133). It is not easy, then, to establish absolute translation equivalence between scientific words in two different languages. But, when the need arises, the gap may be filled by a term borrowed from another language or by the creation of a new term.

In the attempt to cope with the development in the various fields of science and scientific research, some traditional as well as modern Arab linguists, educational bodies and institutions, and some Arab lexicographers, planners, and translators have employed different techniques and methods to construct and expand the Arabic vocabulary. They have used analogy (*al-qiyäs*), compounding (*at-tarkëb*), coinage (*an-Naħt*), derivation (*al-ishtiqäq*), metaphor (*al-majäz*), translation, and Arabicization.

According to Fawwaz Al-Abed Al-Haq, the term "Arabicization" is derived from the word "Arabic," which is the language spoken by Arabs. The verb derived from the term Arabicization is "to Arabicize," which means "to transfer into Arabic." Arabicization has been defined differently by different linguists. Each one defined it from his own point of view regarding the linguistic situation he was concerned with. Al-Abed Al-Haq was able to come up with 12 different definitions of "Arabicization." Mohammad Sayadi, for example, defines "Arabicization" as follows:

> It refers to lexical expansion which involves the rendering or coinage of new words either from existing roots, or through translation of foreign terms, and the adoption of already existing words through borrowing from foreign languages or reviving and revitalization of older usage in the same language. (38)

Furthermore, Arabic Language academies (ALAs) established in Damascus in 1919, in Cairo in 1932, in Baghdad in 1947, in Rabat in 1960, and in Amman in 1976, employed the process of Arabicization to create or modify lists of terms, among which are the technical and scientific terms

that are used in Jordan and Syria. These Arabicized terms were originally borrowed from various languages such as Latin, Greek, English, French, among others. With this goal in mind, ALAs have undertaken the responsibility of publishing and producing pamphlets of the neologisms from standard Arabic to replace the borrowed terms from English or other languages.

The use of Arabicization is controversial. Anwar Chejne cites three Arab schools and their arguments for or against Arabicization:

> One school is generally opposed to Arabization [Arabicization] on the grounds that it will lead to an overflow of foreign words that ultimately do violence to the language and overwhelm it. This school insists on the method of derivation from Arabic roots or at least any of the other methods, alleging that any method of derivation other than Arabization is the only sure way to safeguard the purity and integrity of the language … another school has serious reservations about relying wholly on old methods and favors the indiscriminate use of foreign words in the original form, arguing that this procedure has the advantage of guaranteeing more surely the preservation of their intended meaning. Finally, a third school takes a rather moderate stand between what are apparently two extremes and insists that foreign words can be accepted only as a last resort after every effort has been made to find their equivalents in Arabic by any of the other methods. The academies of Cairo, Damascus, and Baghdad have closely adhered to this principle. (179)

Arabicization has gained its official status by the establishment of the Arabic Academy in Amman. The basic objectives of the Jordanian committee of Arabicization is to coordinate with all Arab efforts to standardize the scientific and technical terminology of the language to maintain Arabic up to date, to translate the scientific works of the developed nations, and to continue cooperation with the Arab countries in order to have a good policy to Arabicize foreign terms.

REVIEW OF RELATED LITERATURE

A number of studies have investigated various Arabicization and Arabic expanding techniques in the Arab World. They include those by Al-Maghraby (1947), Al-Shihaby (1965), Khalifa (1974), Nusayr (1982), Ibrahim (1982), Durrah (1982), Al-Najjar (1984), Mouakket (1986), EI-Mouloudi (1986), Shaheen (1986), Ali (1987), Al-Khouri (1989), Ilyas

(1989), Ghoniem (1989), Awawdeh (1990), Heliel (1991), Khulusi (2000), and Al-Jarf (2004), among others.

Al-Maghraby, who favored and believed in Arabicization, considered it a natural transformation and development or gradual change that occurs in the language, and as such follows its general characteristics. Arabicizing foreign terms constitutes a continuing movement within it.

Al-Shihaby advocated the following set of rules that we should follow in creating new scientific terms:

> Modifying the old meaning of an existing Arabic word to accommodate the new meaning (i.e., semantic extension); deriving new words from Arabic roots or from translated words to refer to the concept; transferring (i.e., translating) foreign words with their meanings (i.e., loan translation); and Arabicized foreign words and their meanings. (28)

Nusayr discussed the process of Arabicization. He stated that there are two principles that must be followed in the Arabicization of new terms:

1. The Arabicized term must be produced with the structural moulds (*qawalib*) and patterns (*awzän*) of Arabic and be easy to pronounce by the native speaker of Arabic.

2. The meaning and referent of the term (the original term) must be agreed upon by more than one universal language such as English, French and German (115–116).

Ibrahim outlined the importance of Arabicizing the human sciences in Arab Universities. He concluded that "if we want our students to be creative and inventive, we must stimulate their imaginations by using their native language, Arabic, and provide them with Arabic resources and references" (4).

Durrah investigated the Arabicization of Administrative sciences and its effect on the understandability and creativity of the learners. He concluded by supporting the idea of Arabicization because it stimulates the Arab learners' imaginations and creativity.

Al-Najjar studied the linguistic and extralinguistic problems of translation between Iraqi Arabic and American English. He investigated several issues including lexical and stylistic equivalence, taking into account the effect on translation of the distance between Iraqi and American cultures. For him, lexical items, with regard to English-Arabic translation, fall into three major classes. The first includes lexical items of the source

language (SL) which have similar items in the target language (TL); the second includes items that have only partial similarities; and the third includes items which do not have equivalents, so that the translator must coin or borrow terms. More effort is needed for the second class. The real problems come from the third class. His classification of lexical items is based on the degree of similarities and/or differences of the structures, the functions of lexical items, and the concepts of lexical items. Al-Najjar compiled the following techniques: loanwords, loanblending, loan translation (semantic calque), semantic extension, compounding, derivation, and definition to deal with lexical items of English or Arabic for which there are no equivalents in the other language.

Mouakket investigated the structural and semantic problems in Arabic-English translation. The focus of his study was on three major areas that are cross-cultural: communication, connotative meanings, and textual levels. He explained how the Arabic lexicon affects the process of translating into English. On the lexical level, Mouakket is concerned with the problems of developments in the Arabic lexicon which caused the Arabic language to resort to borrowing from other languages to meet the pressing need for development. He mentioned some techniques that the translator can resort to, such as compounding, derivation, and loanwords. He concentrated on semantic derivation and lexical gaps and dealt with the meaning of words. He investigated the problems of dictionary meaning vs. contextual meaning, polysemy, synonymy and lexical translatability, and antonymy.

EI-Mouloudi investigated the problem of lexical modernization in Arabic, particularly in the area of science and technology. He concluded that the terms added to Arabic by Arabicization are not based on actual research and scientific investigation and that lexical innovation in Arabic suffers from improvisation and lack of systematization and standardization. EI-Mouloudi listed the following processes of term-creation in Arabic as determined by the Scientific Academy of Damascus:

- *Istinbät* (deduction): The use of native lexical resources (i.e., the revival of archaisms and semantic extension) for the scientific terms.

- *Ishtiqäq* (derivation): The process of forming neologisms in conformity with the structural molds and patterns of Arabic.

- *Naħt* (coinage): A word-formation process where a new lexeme is created from parts of two or more other words.

- *Ta'rëb* (Arabicization): The assimilation of foreign terminology through borrowing or translation.

Shaheen discussed the techniques used to enrich Arabic vocabulary, particularly scientific terms, such as analogy, derivation, compounding, and Arabicization–which is the last technique that translators resort to.

Ali studied the techniques used to develop Arabic vocabulary, particularly scientific terms in Standard Arabic, such as derivation, analogy, compounding (*an-Naħt*), and Arabicization. He reported that derivation is the most important principle of word creation. It represents the most natural method by which the language has been able to generate the overwhelming majority of its native vocabulary. Analogy is the method by which new words are formed or derived in accordance with already existing word patterns. In the case of compounding, the elements constituting the compound words (e.g. doorhandle, headmaster, etc.) are kept intact, i.e. they retain the same number of sounds they have at pre-compound level. Whereas, *an-Naħt* means that one or more radical consonants of more than one root take part in the formation of a single lexical item.

Ghoniem identified three main meanings for Arabicization (64). First, it means the use of loanwords assimilated according to the molds available in Arabic. Second, it refers to direct translation from foreign languages into Arabic through a process called "calque." Finally, Arabicization is a constitutionalized process which refers to the efforts undertaken by the Arabic language academies in an attempt to urge Arabic to be used at individual, national and international levels as a language of thought and science.

Ilyas suggested the following techniques to overcome the obstacles and problems of producing translations of scientific texts into Arabic:

1. Making use of Classical Arabic technical terms as much as possible as in the case of: ammonia/*nashädir*, acetic acid/*ħimd 'lkhalëk*.

2. Where there is no Arabic equivalent for rendering a SL technical term the following techniques are suggested:

   A. "Derivation: Arabic facilitates the use of derivation for the formation of new families of technical words.

The newest and most common grammatical models of such technical items take the form of '*mifcl*,' '*mifcäl*,' '*fcälah*,' '*fäcl*,' '*mifcl*,' etc..." (110).

B. "Assigning a new technical meaning to an Arabic word that has another signification, such as '*Siyärah*,' which originally signified moving things, such as stars in particular" (110).

C. "*An-Naħt*: The technical terms following this approach are formed by combining more than one morphological root (i.e., creating new compounds), such as: 'hydroelectric' (*Kahrűmä'ë*), 'space-time' (*Azmkän*)" (110).

Awawdeh dealt with the major problems of scientific-technical translation from English into Arabic. He maintained that the principal difficulties in translation arise from constant innovations in language, changes in meaning, polysemy and ambiguity, and from the cultural background implicit in a text. He presented six types of major problems, which can be itemized as lexical, syntactic, morphological, cultural, metaphorical, and cohesive. Awawdeh selected 26 texts representing various fields and disciplines of science, then translated all these texts to identify the problems that may arise in the process. According to Awawdeh, technical terms in English can be classified into the following categories:

1. "Terms derived from Latin and Greek, such as 'zoology,' which is compounded from Greek *logos* ('study') and *zoion* ('animal'); and 'science,' from Latin *scienta*, which originally referred to knowledge in general" (18).

2. "Terms derived from proper names such as 'Addison's disease,' 'Bahjat's disease,' 'Watt,' etc..." (18).

3. "Abbreviations and symbols, like c.g. ('center of gravity'), d.c. ('direct current'), H_2O, the symbol for water, and so on" (18).

4. "Terms derived from common linguistic roots, like 'emission' (from 'emit'), 'receiver' (from 'receive'), etc..." (18).

Heliel presented the problems of Arabic translators in scientific fields by concentrating on one phenomenon, which is the scientific term and its Arabic equivalent. He then discussed the shortage of bilingual specialist dictionaries, which increases the difficulty of the specialist translator to find an equivalent for the foreign scientific term.

Khulusi wrote about the narrowest sense of the term "Arabicization," which for him was merely transliterating a foreign term according to Arabic characters (e.g., English "radar" is Arabicized as "*rädär*"). He differentiated between Arabicization and translation: translation is transferring the meaning and the style from one language into another, whereas Arabicization refers to a foreign term in Arabic letters (i.e., is a phonetic borrowing). It is known in English as transliteration or transcription.

As far as the researchers are concerned, the current study is the first in the field of scientific and technical translation in the Arab countries of Jordan and Syria. It attempts to explore the various Arabicization and Arabic expanding techniques which faculty members of Jordan University of Science and Technology (JUST) in Jordan (where the medium of instruction is English) and of the University of Damascus (UD) in Syria (where Arabic is the medium of instruction) resort to and use in lectures when they have to deal with scientific terms.

DEFINITION OF TERMS

Arabicization

In this study, the term "Arabicization" is used to refer to the process of transliterating a foreign term according to Arabic phonological and morphogical rules. To this effect, when a certain technical term is Arabicized, it means that it is linguistically borrowed from English and used in Arabic with some modification, e.g., "filtration" (*faltarah*) or without modification, e.g., "filter" (*filtar*). In this regard, the term "Arabicization" is used to refer to the process of finding an equivalent for the scientific terms by means of the use of loanforms, acronyms, abbreviations, derivations from foreign roots, and eponyms.

Arabic expanding techniques

In this study, the term "Arabic expanding techniques" is used to refer to the process of finding an equivalent for the scientific term by means of loan translation, derivation from Arabic roots, *an-Naħt*, compounding

(*at-Tarkëb*), semantic extension, the classical Arabic vocabularies, and translation by definition.

Acronyms

Acronyms are words derived from the initial letters of several words, such as "radar" ("radio detection and ranging") and "laser" ("light amplification by stimulated emission of radiation"), etc. Normally, an acronym is transliterated as a loanword.

Abbreviation

A shortened form of a technical term used to represent the complete form. For example, the English abbreviation DDT, which stands for "dichloro-diphenyl-tricloroethane," is transferred into Arabic as a loan constituting the phonetic values of its individual letters (i.e., dii dii tii). The shortened form "PC" stands for "personal computer."

Loanblends

In this technique, parts of words from both the source language (SL) and the target language (TL) are joined together to create a new item in the TL to signify one concept. For example, the scientific term "acetic" is phonemically transferred into Arabic as the loanblend "*khalëk*" which consists of two parts: "*alkhal*" (for "acet-"), which is an Arabic stem (which is a substitution), and "-*ek*," which is borrowed from the English morpheme "-ic" (for its phonetic value). Another case for this technique is when the scientific term consists of two words (compound words): an Arabic word and a loanblend to stand for a concept represented by two morphemes of the SL.

Derivation

Derivation is an important technique used to enlarge the Arabic vocabulary and develop its new scientific terms. It is reliable and could help the Arabic language encounter new technical foreign terms. For example, "*dhariayah*" ("atomic") is derived from the root "*dharah*" ("atom"). Another example is when new signifiers are derived from an Arabicized term, such as "*yata'yun*" ("ionize"), from "*yŭn*" ("ion"), and "*meghnatisia*" ("magnetism") from "*meghnatis*" ("magnet").

Compounding

In this technique, new words are formed by combining more than one word to create new, compound words. For example, a group of words, usually two or three, of the TL are employed to stand for a concept represented by a single morpheme of the SL, such as "*faqiru 'dam*" for "anemia," and "*farţu 'tawatur 'sharayänë*" for "hypertension."

An-Naħt (Blending)

In this type, the lexical items which are created in the TL are abbreviated and compounded to form a shorter construct (usually one word). The following are examples of blends that have attained full status in English: "smog" (from smoke + fog), and "motel" (from motor + hotel). The same process is applicable in Arabic. For example, the Arabic word *dhabkhan* ("smog") is compounded by means of imitating the English compound. The equivalents of the English source for "smog" (*sm-* from *sm*oke, and *-og* from f*og*), which are *-khan* (from *dukhän*, "smoke," and *dhab-* [from *dhabäb*], "fog"), are used in Arabic as an equivalent for the English compound.

Loan translation (Calques)

In this technique, the scientific terms of the SL are not transferred into the TL; rather, the TL is motivated to employ some of its lexical items to form new signifiers that would correspond to the foreign ones. Scientific terminology is more likely to pass through loan translation "calquing," whereby the scientific term is reproduced exactly item by item. For example, the compound word "jaw crusher" is translated literally into Arabic "*alkasärah 'lfakiyah*."

Semantic extension (Semantic calques)

In semantic extension (i.e., *al-majäz*) an Arabic word is assigned a new technical meaning which will stand as an equivalent for the foreign new technical term. For example "*qitär*" originally denoted a caravan of camels and later on was used to denote "train." Another example, "*mawjah*" ("wave") in addition to denoting water waves, also denotes electromagnetic waves, following the SL: the link is in the nature and shape of the motion of waves.

The revival of some Arabic terms (classical Arabic)

The revival of Arabic words is one of the most important methods for dealing with new foreign items. For example the old Arabic term for the medical term "malaria" is "*Al-burda.*"

Translation by definition (or Paraphrasing)

In this technique, the Arabicized scientific term is defined or paraphrased using as many lexical Arabic equivalents as needed to explain the meaning of the original term. For example, "enthalpy" (*Inṭälbë)* is defined as "the total content heat" ("*'lmuħtawa `lħaräry 'lkulëy*").

Names of the developers, founders, or influential persons (i.e., Eponyms)

In this technique, the technical terms are derived from proper names after which they were named, such as "Volt," "Watt," "Newton," "Kelvin," etc.

Scientific fields include the following:

- medical fields (medicine, dentistry and pharmacy)
- engineering fields (electrical, civil, mechanical, computer, and information technology).

RESEARCH HYPOTHESIS

The following hypothesis is tested in the study:
There are no statistically significant differences between Arabicization and Arabic expanding techniques used by the engineering and medicine faculty of JUST and UD in their science lectures.

PARTICIPANTS OF THE STUDY

The participants of the present study were 47 faculty members in different scientific fields at JUST, and 42 faculty members at UD. Table 1 presents the distribution of the faculty members in the study:

Table (1): The distribution of faculty members in the study.

University	No. of participants in the Med. Fields	%	No. of participants in the Eng. Fields	%	Total no. of participants	%
JUST	18	51	29	54	47	53
UD	17	49	25	46	42	47
Total	35	100%	54	100%	89	100%

It is worthwhile to mention that English is the medium of instruction of the Jordanian faculties for all scientific fields, yet the faculty members can use Arabic whenever they want. There is no mandate forcing them to use English; that is just the practice currently in Jordan, since almost all of the faculty members are graduated from universities where English is the medium of instruction. Their students' proficiency in English ranged between intermediate and high since all of them were from science courses. Besides, the students are required to study a number of courses in English to enhance their proficiency in the language. In Syrian universities, on the other hand, there is a mandate to use Arabic as a medium of instruction; English is used only for idiomatic expressions.

INSTRUMENT

In order to achieve the objective of the study, the researchers constructed an observation checklist (see Appendix 1). The checklist consisted of two parts: part one included general information about the faculty member's background, while the second part contained the Arabicization and Arabic expanding techniques which the instructors used in their lectures. The frequency of the participants' use of these techniques was recorded according to these alternatives: Seldom, Sometimes, Often, or Not Observed.

VALIDITY OF THE INSTRUMENT

The researchers of this study established the content validity of the checklist before conducting the study by asking 12 specialists in the fields of teaching English as a foreign language (TEFL), translation, Arabicization, the Arabic language, language planning, measurement and evaluation, statistics and linguistics in order to examine the wording and the suitability of its items to achieve its purpose. The panel of experts agreed that the checklist did in fact assess what it was supposed to assess.

DATA COLLECTION PROCEDURE

The study instrument was used to collect the data. The researchers sent letters to the presidents of the two universities to get their consent to carry out the study. After getting their approval, the faculty members who participated in the study were approached and asked if they were willing to participate. When they gave their consent, the researchers used the observation checklist by marking each of the Arabicization and Arabic expanding techniques according to alternatives (see Appendix 2).

RESULTS OF THE STUDY AND THEIR DISCUSSION

Tables (2-A) and (2-B) present the rank, mean and standard deviations of the Arabicization and Arabic expanding techniques used by the faculty members in the fields of engineering and medicine in JUST and UD for their lectures.

Table 2-A: Rank, Means and Standard deviations and the Results of Arabicization and Arabic expanding techniques used by faculty members in engineering and medicine in JUST for their lectures.

Technique no.	Arabicization and Arabic expanding techniques used in the lectures	University					
		JUST					
		Engineering			Medical		
		N=29			N=18		
		Rank	Mean	Std. Dev	Rank	Mean	Std. Dev
1	The use of Loanforms	2	3	0	1	3	0
2	The use of Acronyms	3	3	0	3	2	1
3	The use of Abbreviations	1	3	0	2	3	0
4	The use of Loanblends	12	0	0	8	0	0
5	Derivation from an Arabic root	7	0	0	9	0	0
6	Derivation from Foreign words	6	1	0	10	0	0
7	The use of **At-Tarkëb**	8	0	0	6	0	0
8	The use of **An-Naḥt**	10	0	0	7	0	0

9	Semantic extension (Metaphor)	11	0	0	11	0	0,.60
10	Loan translation	5	2	0	5	1	0
11	Classical Arabic terms	13	0	0	13	0	0
12	Translation by definition	4	2	0	4	1	0
13	Eponyms	8	0	0	12	0	0

Table 2-B: Rank, Means and Standard deviations and the Results of Arabicization and Arabic expanding techniques used by faculty members in engineering and medicine in UD for their lectures.

Technique no.	Arabicization and Arabic expanding techniques used in lectures	University					
		UD					
		Engineering			Medical		
		N=25			N=17		
		Rank	Mean	Std. Dev	Rank	Mean	Std. Dev
1	The use of Loanforms	6	1	0	6	1	0
2	The use of Acronyms	11	0	0	11	0	0
3	The use of Abbreviations	2	3	0	5	2	0
4	The use of Loanblends	12	0	0	9	1	0
5	Derivation from an Arabic root	5	2	0	2	3	0
6	Derivation from Foreign words	9	0	0	13	0	0
7	The use of **At-Tarkëb**	4	2	0	4	3	0
8	The use of **An-Naħt**	7	0	0	7	1	0
9	Semantic extension (Metaphor)	8	0	0	8	1	0
10	Loan translation	1	3	0	1	3	0
11	Classical Arabic terms	13	0	0	10	0	1
12	Translation by definition	3	3	0	3	3	0
13	Eponyms	9	0	0	12	0	0

Table 2-A shows that the instructors at JUST used abbreviations in engineering fields and loanforms in medical fields more than any other technique, while table 2-B shows that the instructors at UD used loan translation more than the other techniques. This result goes in line with that of Laurel Benhamida's 1989 study. Classical Arabic terms were either never used, or rarely used by the instructors in both universities. It is clear that the extent of using the 13 techniques vary significantly from one university to another, while the variation in this extent is much less from one field to another within the same university.

The researchers next performed a T-Test in order to find out if there were any statistically significant differences between Arabicization and Arabic expanding techniques employed by the sample from both universities. Table 3 presents the results of this analysis.

Table 3: The t-test results of the means of the Arabicization and Arabic expanding techniques used in the lectures at JUST and UD.

Arabicization and Arabic expanding techniques	University	N	Means	Std. Dev.	t. value	.sig
The use of Loanforms	JUST	47	3	0	15	0
	UD	42	1	0		
The use of Acronyms	JUST	47	2	0	11	0
	UD	42	0	0		
The use of Abbreviations	JUST	47	3	0	3	0
	UD	42	3	0		
The use of Loanblends	JUST	47	0	0	1	0
	UD	42	0	0		
The use of Derivation from foreign roots	JUST	47	1	0	5	0
	UD	42	0	0		
The use of Derivation from Arabic roots	JUST	47	0	0	10	0
	UD	42	2	0		
The use of **At-Tarkëb**	JUST	47	0	0	11	0
	UD	42	2	0		
The use of **An-Naḥt**	JUST	47	0	0	2	0
	UD	42	1	0		

The use of Semantic extension	JUST	47	0	0	3	0
	UD	42	0	0		
The use of Loan translation	JUST	47	1	0	13	0
	UD	42	3	0		
The use of Classical Arabic terms	JUST	47	0	0	2	0
	UD	42	0	0		
The use of Translation by definition	JUST	47	2	0	8	0
	UD	42	3	0		
The use of Eponyms	JUST	47	0	0	2	0
	UD	42	0	0		
Total	JUST	47	1	0	2	0
	UD	42	1	0		

It is clear from Table 3 that there are statistically significant differences at (α= 0.05) between most of the techniques used by the sample. It is clear there are statistically significant differences between the means in the use of Loanforms, Acronyms, Abbreviations, and Derivation from foreign roots in favor of JUST; while statistically significant differences exist between the means in the use of Derivation from Arabic roots, *At-Tarkëb*, *An-Naħt*, Semantic extension, Classical Arabic terms and Translation by definition in favor of the UD. It is also evident that there are no statistically significant differences between the use of Loanblends and Eponyms in the two universities.

On the whole, there are statistically significant differences between the use of Arabicization and Arabic expanding techniques in the two universities. The faculty members in UD used Arabicization and Arabic expanding techniques in their lectures more frequently compared to the faculty members in JUST. The reason behind such a result is due to the fact that these techniques are familiar and well-known to the faculty members in UD more than in JUST. In addition, the faculty members in UD seem have an awareness, a solid knowledge and a wide use of the Arabicized terms and their Arabic equivalents. Furthermore, the faculty members in UD have a good command of both Arabic and English.

The results do not support the hypothesis of the study since there are significant differences between the means of the use of the Arabicization and Arabic expanding techniques by the faculty members in JUST

and UD. It is evident that the use of the Arabicization techniques (i.e., by means of the use of loanforms, acronyms, abbreviations and derivation from foreign roots) in JUST is more prevalent than in the UD, and the use of Arabic expanding techniques (i.e., by means of loan translation, derivation from Arabic roots, *an-Naħt*, compounding or *at-Tarkëb*, semantic extension, the classical Arabic vocabularies, and translation by definition) in UD is more prevalent than in JUST. This means that the use of the Arabicized scientific terms in JUST is higher than that in the UD, and the use of the Arabic equivalents in UD is higher than that in JUST. The reason for this result can be the the medium of instruction in each university. This result agrees with the results reached by Ibrahim, Al-Najjar, Mouakket, Ali, Shahrour, Nahhas, and Al-Jarf. Therefore, the faculty members of UD and JUST acquire the scientific terms according to their instructional contexts. They are exposed to thousands of different scientific terms, whether Arabicized or Arabic equivalents. Some, because of the special circumstances they are in, pick up a foreign language in the same way they learned their mother language. But it is natural that even in these situations, the processes of acquiring the scientific language and the capacity that goes into the acquisition of the language determine how one acquires scientific terms. Consequently, Arabic is the dominant language in UD. This result is also supported by M.S. Thirumalai, who argues that:

> Mother tongue is the first known, the most familiar and the closest of all languages to a child. Because of the above, mother tongue offers the most meaningful system of signs, which works with greater speed and facility than a system of signs offered by another language. A child using a language other than his own mother tongue will have problems of adjustments–linguistically, socially and culturally. Use of a language other than mother tongue will inhibit the intellectual growth and development, and thinking processes. Emotional stability is better achieved through a use of mother tongue. (185)

The Arabic vocabulary includes numerous terms which are no longer used widely. There were some classical Arabic terms that were not commonly used by the participants of the study, a fact which may have contributed to the lack of success of Arabic equivalents. The participants' unfamiliarity with these Arabic terms becomes a factor. It must be admitted that though such terms have remained in the books, they had never been used by the specialists or translators or authors, making them eventually worthless. Many scholars think that the revival of old or dead Arabic words is the first

principle that the translator should follow in finding new scientific terms, and they feel that the only acceptable method for reviving these words is to re-use them. This observation agrees with the results reached by Al-Shihaby, Khalifa, Nusayr, Shaheen, Ilyas, Al-Khouri, and Khatib. Moreover, Arabic language academies have taken the responsibility of reviving old Arabic vocabulary items and considered these as dead words that must be re-used (For more details see Al-Komy 78, and Al- Sayadi 52).

It must be admitted that many of the Arabic scientific terms being used currently vary from one country to another because every Arab country, unfortunately, is working independently to translate the numerous neologisms of technology into Arabic. Also, many Arab countries have established Arabic language academies to provide their respective countries with the required Arabic terminology. Each Arabic academy chooses an Arabic equivalent well-known in its country.

Finally, it is evident from the results that English as a medium of instruction continues to dominate the sciences in JUST. It continues to be an exclusive medium in medicine and engineering because it is the language used all over the world, whereas Arabic is spoken only in some countries. Moreover, English is the language of science and technology, research, and economy. It is an international language. Most of the books, periodicals, papers, and electronic databases essential for the intensive and extensive study of an academic subject are written in English. David Crystal acknowledges that its use as a *lingua franca* is closely connected with its rise as a world language. According to him "a language achieves a genuinely global status when it develops a special role that is recognized in every country" (237).

RECOMMENDATIONS

In light of the findings of the study, the researchers recommend the following:

1. Using Arabic in our education as a medium of instruction and a tool of expression is recommended. As the UNESCO stated in *The Use of Vernacular Languages in Education*, "every effort should be made to provide education in the mother tongue." This recommendation goes in line with Dajani, Deller and Rinvolucri, Thirumalai. and with the UNESCO's case studies of 2008.

2. Using English or any foreign language is also recommended besides the mother tongue since this process

can greatly facilitate and enhance terminology acquisition in particular and language acquisition in general.

3. It is recommended that knowing the attitudes of specialists in the field concerning the standardization and unification of Arabic terminology in general and technical terms in particular will help higher authorities in charge of Arabicization, like different Arabic language academies, in their plans and projects. The authorities stand to benefit from the specialists' opinions as well as from the data this research has produced, which provides evidence for the serious need to unify Arabic technical terms.

4. A unified Arabic information bank or a unified Arabic center for translation should be established. It must include specialists in the field for rendering the new scientific terms to cope with the enormous flow of scientific and technological terms that need Arabic equivalents.

5. There should be an open channel of communication among Arabic language academies to coordinate their efforts to unify and standardize the use of Arabic terminology in all fields.

6. Teaching terminology in the classroom is a question that has been discussed among language teachers, researchers, terminologists, linguists, among others, for many decades and is still under debate (see Borg). In this sense, one can easily acquire full fluency of the scientific language, if s/he is heavily exposed to that language and recognizes its techniques in the classroom. It should be mentioned that one of the problems of terminology teaching is how to select what terms to teach. This study confirms that the teachability of the scientific terms in the classroom is applicable through Arabicization and Arabic expanding techniques by using Jeremy Harmer's principle (154). Accordingly, we can decide which technique we should teach on the basis of how frequently they are used by speakers of the language. The techniques which are more commonly used are the ones we should teach first (For more information on this topic, see Appendix 2).

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APPENDIX 1: OBSERVATION CHECKLIST

Part 1: General Information

Date of Observation: Time of Observation: from ---- to ----
Students' level: No. of students:

1- Gender: A) male B) female

2- University name:
     A) Jordan University of Science and Technology
     B) University of Damascus

3- Major (Specialization):
- Engineering Fields:
  - A) Electric Engineering
  - B) Civil Engineering
  - C) Mechanical Engineering
  - D) Computer Engineering and Information Technology
- Medical Fields:
  - A) Medicine • B) Pharmacy • C) Dentistry
- The subject of the lecture:

4- Academic level:
- A) Lecturer • B) Instructor • C) Assistant Prof.
- D) Associate Prof. • E) Prof. • F) Others

5- Experience (years):
- A) 1–4 • B) 5–8 • C) 9–12
- D) 13–17 • E) More than 18

Part 2: Arabicization and Arabic expanding techniques used in the scientific lectures

Arabicization and Arabic expanding techniques used in the lectures	Usage				Comments
	Seldom	Sometimes	Often	*Not observed	
1-The use of Loanforms					
2- The use of Acronyms					
3- The use of Abbreviations					
4- The use of Loanblends					
5- Derivation from an Arabic root					

6- Derivation from Foreign words				
7- The use of **At-tarkëb** (compounding)				
8- The use of **An-Naht** (blending)				
9- Semantic extension (metaphor)				
10- Loan translation				
11- Classical Arabic terms (Old Arabic terms)				
12- Translation by definition				
13- The Use of Eponyms				

*"Not observed" indicates one of two things: first it may indicate that the observation area on the checklist does not apply to the course being taught, or it may indicate that the area addressed on the checklist did not occur in the lecture being observed when it could have or should have been.

APPENDIX 2

The frequencies and the percentages of Arabicization and Arabic expanding techniques used in the lectures by the faculty members in JUST and UD.

Arabicization and Arabic expanding techniques	Univ.	Not Observed		Seldom		Some-times		Often		Total	
		F	%	F	%	F	%	F	%	F	%
The use of Loanforms	JUST	0	0	2	4	1	2	44	94	47	100
	UD	2	5	28	67	11	26	1	2	42	100
The use of Acronyms	JUST	4	9	4	9	12	26	27	57	47	100
	UD	31	74	8	19	3	7	0	0	42	100
The use of Abbreviations	JUST	0	0	1	2	3	6	43	92	47	100
	UD	0	0	1	2	16	38	25	60	42	100

The use of Loanblends	JUST	32	68	14	30	1	2	0	0	47	100
	UD	26	62	11	26	5	12	0	0	42	100
The use of Derivation from foreign roots	JUST	14	30	19	40	11	23	3	6	47	100
	UD	33	79	7	17	2	5	0	0	42	100
The use of Derivation from Arabic roots	JUST	15	32	25	53	6	13	1	2	47	100
	UD	0	0	4	10	20	48	18	43	42	100
The use of **At-Tarkëb**	JUST	13	28	28	60	6	13	0	0	42	100
	UD	1	2	0	0	25	60	16	38	42	100
The use of **An-Naḥt**	JUST	26	55	13	28	8	17	0	0	47	100
	UD	12	29	19	45	10	24	1	2	42	100
The use of Semantic extension	JUST	38	81	7	15	2	4	0	0	47	100
	UD	20	48	14	33	8	19	0	0	42	100
The use of Loan translation	JUST	1	2	32	68	7	15	7	15	47	100
	UD	0	0	0	0	1	2	41	98	42	100
The use of Classical Arabic terms	JUST	46	98	0	0	1	2	0	0	47	100
	UD	35	83	1	2	5	12	1	2	42	100
The use of Translation by definition	JUST	2	4	25	53	14	30	6	13	47	100
	UD	0	0	0	0	14	33	28	67	42	100
The Use of Eponyms	JUST	28	60	10	21	8	17	1	2	47	100
	UD	31	74	7	17	4	10	0	0	42	100

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