جـامـعـة الـشـرق الأوسـط
MIDDLE EAST UNIVERSITY

Difficulties Faced by Jordanian English and Science Major Students in Learning Hybrid Pairs

الصعوبات التي يواجهها الطلبة الأردنيون في تخصصَيّ اللغة الإنجليزية والعلوم في تعلم الأزواج الهجينة

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Authorization

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Dedication

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List of Abbreviations

1. Adj.	Adjective
2. ANOVA	Analysis of Variation
3. E.g.	Example
4. EMS	English Major Students
5. F	Fisher
6. G	Greek
7. H. P	Hybrid Pairs
8. L	Latin
9. LSD	Least Significant Differences
10. MMS	Medicine Major Students
11. N	Noun
12. S. D	Standard Deviation
13. Sig	Significant
14. SMS	Science Major Students
15. SPSS	Statistical Packet for Social Sciences
16. V	Verb

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Abstract

This study explored difficulties faced by Jordanian English and science major students in learning hybrid pairs. There is a sense of fear among the Jordanian students that the use and learning of hybrid pairs will be an in-surmountable problem. This present study aimed at investigating the difficulties behind this sense, offered suggested solutions and tried to figure out if there was a relationship between specialization and learning hybrid pairs through answering the following three questions:

- What makes hybrid pairs difficult to master by English and Science major Students?
- What are the suggested solutions to overcome difficulties that English and Science major students encounter in learning hybrid pairs?

- Is there a relationship between specialization and mastering hybrid pairs?

To achieve these goals, the researcher selected a sample from the University of Jordan. The sample consisted of two hundred (200) science and English major students (female and male). Moreover, this sample was selected randomly from students at the final level. The researcher used three instruments to answer the questions of the study: a questionnaire, diagnostic vocabulary tests and semi-structured interviews which were distributed for collecting data; the instruments were designed specifically to address the questions of the study. The questionnaire consisted of two parts. The first part, entitled the difficulties that encounter students in learning hybrid pairs, consisted of twenty items; each item reflects their difficulties in learning hybrid pairs. The second part, entitled the suggested solutions according to English and science major students, consisted of ten items; each item reflects their attitudes towards suggested solutions. Part one and two are in the form of filling the number that corresponds to difficulties and suggested solutions in learning hybrid pairs according to the following scale: strongly agree, agree, uncertain, disagree, strongly disagree. The second instrument entitled diagnostic vocabulary test aimed at finding out the relationship between learning hybrid pairs and specialization. Through answering six sections, each section entitled diagnostic vocabulary test. These sections were in the form of match between nouns and their adjectives, put right or false in front of each item and the last form was, fill in the blanks with a suitable word. The researcher also conducted semi-structured interviews (See p. 51) with experts in the field of teaching English language to collect more

information. The results of the study revealed that English and science major students faced many difficulties in learning hybrid pairs. The reasons behind these difficulties were found to be:

1- Hybrid pairs are morphologically unrelated (i.e. there is no formal relationship between nouns and their adjectives).For example there is no relationship between "hand" and its adjective "manual".

2- Most textbook writers ignore such words.

3- Technical words (i.e. hybrid pairs) are long, difficult to pronounce and unfamiliar so students avoid using them in their conversation.

4- Lack of knowledge of Latin and Greek elements (i.e. they did not know the etymology of the word); this is because of lack of books on teaching the etymology of words.

The study, then, tested whether the findings were different from one field to another based on specialization. The findings showed that there is a significant correlation between specialization and learning hybrid pairs. There are statistically significant differences between English and science in favor of science. Moreover, the researcher suggested some suitable solutions to these difficulties which are:

- Teachers and students should activate themselves more by consulting and reading specialized references.

- Teaching etymology of words should be under study in Jordanian universities.

- The study concluded with some recommendations calling for further research.

الصعوبات التي يواجهها الطلبة الأردنيون في تخصصي اللغة الإنجليزية والعلوم في تعلم الأزواج الهجينة

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ملخص الدراسة

تحرت هذه الدراسة كشف الصعوبات التي يواجهها الطلبة الأردنيون في تخصصي اللغة الإنجليزية والعلوم في تعلم الأزواج الهجينة. كما هدفت الدراسة لمعرفة ما إذا كان هناك علاقة بين التخصص وتعلم الأزواج الهجينة من خلال الإجابة على الأسئلة الثلاثة التالية :-

1- ما الذي يجعل تعلم الأزواج الهجينة صعبة لدى طلاب اللغة الإنجليزية والعلوم ؟
2- ما هي الحلول المقترحة لحل الصعوبات التي يواجهها طلاب اللغة الإنجليزية والعلوم ؟
3- هل هناك علاقة بين التخصص وتعلم الأزواج الهجينة ؟

لتحقيق هذه الأهداف قامت الباحثة بإختيار عينة عشوائية من طلاب الجامعة الأردنية والتي تضم مائتي طالب وطالبة من طلاب اللغة الإنجليزية والعلوم للفصل الدراسي النهائي. للإجابة على أسئلة الدراسة استخدمت الباحثة ثلاث وسائل. تم توزيع استبيان صمّم بشكل محدد لجمع المعلومات، حيث تكونت هذه الأستبانة من جزئين. الجزء الأول بعنوان الصعوبات التي يواجهها الطلبة في تعلم الأزواج الهجينة من خلال الإجابة على عشرون عبارة، كل عبارة تعكس هذه الصعوبات، والجزء الثاني بعنوان الحلول المقترحة لحل الصعوبات حيث ضمّ هذا الجزء عشر عبارات، كل عبارة تعكس آراء الطلاب نحو الحلول المقترحة ضمن المقياس التالي :- موافق بشدة، موافق، غير متأكد، غير موافق وغير موافق بشدة. الأداة الثانية للدراسة بعنوان اختبار المفردات التشخيصي. هدفت هذه الأداة إلى إيجاد العلاقة بين التخصص

وتعلم الأزواج الهجينة من خلال الإجابة على ستة أقسام على شكل، صل بين الأسماء وصفاتهم، ضع صح أو خطأ مقابل كل عبارة واملئ الفراغ بالكلمة المناسبة. أيضا قامت الباحثة بإجراء مقابلات مع خبراء يعملون في حقل تعليم اللغة الإنجليزية لجمع معلومات أكثر من خلال طرح بعض الأسئلة، أنظر صفحة (51). أظهرت نتائج الدراسة أن طلاب اللغة الإنجليزية والعلوم يواجهون عدة صعوبات في تعلم الأزواج الهجينة والأسباب وراء هذه الصعوبات هي :-

1- الأزواج الهجينة تعني أنه لا يوجد علاقة صرفية بين الأسماء والصفات، مثال على ذلك لا يوجد علاقة صرفية بين يد كأسم ويدويً كصفة.
2- تجاهل معظم مؤلفي الكتب المدرسية مثل هذه الكلمات.
3- تجنب الطلاب استعمال الأزواج الهجينة بسبب بنيتها، صعوبة لفظها وعدم معرفتهم لمثل هذه المفردات.
4- نقص المعرفة بالعناصر اللاتينية والإغريقية، بمعنى أن الطلاب ليس لديهم معرفة بأصول الكلمة وهذا بسبب أن الكتب المدرسية تفتقد تعليم أصول المفردات.

بعد ذلك قامت الباحثة باختبار فيما إذا كانت النتائج تختلف من حقل لآخر بناءاً على التخصص. حيث أظهرت النتائج وجود ترابط بين التخصص وتعلم الأزواج الهجينة. لذا كان هناك اختلاف واضح بين طلاب اللغة الإنجليزية وطلاب العلوم نحو تعلم الأزواج الهجينة لمصلحة طلاب العلوم، علاوةً على ذلك اقترحت الباحثة بعض الحلول المناسبة لهذه الصعوبات، كما أوصت الدراسة بما يلي :-

- على المعلمين والطلاب تدريب أنفسهم عن طريق اختيار وقراءة المراجع المخصصة.
- تدريس أصول المفردات في الجامعات الأردنية.
- انتهت الدراسة بتوصيات لإجراء بحوث أخرى.

Chapter One

Introduction

1.1 Background of the Study

The vocabulary of modern English largely comes from two major sources, Germanic languages, and Anglo-Saxon, the high frequency words of English. The English vocabulary development activities and resources are based on Latin and Greek elements that are included in thousands of English terms. Few schools and universities currently provide learning situations and activities that include vocabulary etymology and histories; therefore, it is advantageous for students to learn more about the English vocabulary development. This study focuses on the difficulties of mastering hybrid pairs by foreign language learners since they undoubtedly face numerous difficulties in mastering it. Such a problem is aggravated when the foreign language has a lot of irregularities. Absolutely English is one of such languages. It has many irregularities especially in the field of morphology. As a result of innovation and linguistic prosperity and due to the fast spread of scientific terms, students lack experience in recognizing them. It has become important to enrich the English scientific vocabulary (i.e. hybrid pairs) and above all offer solutions that suit the needs of English and science major students to guess hybrid pairs. Therefore, the researcher suggests that there are many points that need to be clarified. Learners of English face many problems in recognizing hybrid pairs. This study

focuses on hybrid pairs since they are morphologically unrelated. There is no relation between such words as illustrated below:

Noun	**Irregular derivation**
church	ecclesiastical
cow	bovine
dog	canine
eye	ocular
light	lucid
milk	lactic
moon	lunar
nose	nasal
rain	pluvial
water	aqueous
year	annual

Although hybrid pairs are considered as powerful attractions of science, there are many difficulties in recognizing them since these words are unknown for everybody and one needs to know their roots and origins. In fact, English adopts many morphological processes in word coinage. Booij (2005), Bybee (1985) and Crystal (2003) defined that morphology as the science which studies morphemes or the system of word classes, word formation, and inflection characteristics of a certain language. Morphology is divided into major subjects, one concerned with the form of lexemes (inflection) and the other with word

formation. The process of inflection means to change the grammar of word as illustrated below:

Inflection	*Regular*	*Irregular*
Plural (s)	book / books	man/men
Passive (-s)	Mary's book	…….
Comparative (-er)	tall/taller	good/better
Superlative (-est)	long/longest	bad/worst
Pronunciation	brake + s/brakes	have + s / has be + s / is
Present Participle (-ing)	read + ing / reading	……
Past Participle (-ed-en)	play + ed / played	take + en / taken
Present tense third person singular (-s)	she, he, it / likes	……
Past tense	clean +ed /cleaned	the zero allomorph put / put replacement allomorph write / wrote changeable allomorph be / was

Adams (1973), Bauer (1983) and Yule (2006) illustrated that word formation processes are divided into:

- Back formation: It is the process of deriving words by dropping suffix or prefix. e.g.:

  Disabled / abled.

- Compounding: It is a process in which two different words are joined together. e.g.:

  Skate + board → skateboard

- Clipping or abbreviation: It is shortening of a word by the omission of one or more syllables. e.g.:

  Professor → prof

  Facsimile → fax

- Acronym: It is a word formed from initial letters of a few words in a phrase or a name. e.g.:

  North Atlantic Treaty Organization → NATO

- Zero derivation also, called conversion or functional shift: It is a change in the function of the verb without changing its form. e.g.:

  Comb (noun) → comb (verb)

- Blending: It is taking words and joining them, two more morphemes are combined to form a new word. e.g.:

  Breakfast + lunch → branch

- Borrowing: It is taking a word from one language and incorporating it into another. e.g.:

Telephone and net.

- Coinage: It means the invention of new terms for trade name or company. e.g.:

  Nylon and aspirin

- Echoism: It means the sound suggests the meaning. e.g.:

  Roar of waterfall

- Antonomasia: It means the formation of a common noun, a verb or an adjective from the name of a person or a place. e.g.:

  Lover → Romeo

- Reduplication: It creates new words by dappling the morpheme or changing of the vowel or consonant. e.g.:

  Tiptop and pooh-pooh

- Stress shift since there are not any affixes added. e.g.:

  ́combined (n) – ́combined (v)

- Folk etymology: It is a change in a word or phrase over time resulting from the replacement of an unfamiliar form by a more familiar one. e.g.: 'primrose', a type of flower, was reinterpreted by way of folk etymology

to include the English name of another flower, rose, although the word was originally borrowed from old French primerole.

- Derivation, the most common word formation process in English language. It is the creation of words by modification of roots without the addition of other roots; often the effect is a change in part of speech by adding affixes to roots. Derivation is divided into two classes; the first one is class maintaining which means no change in the part of speech example: king (n) + Dom →kingdom (n). The second class is class changing, which is divided into two parts, regular part example: class (n) + ify →classify. The second part is irregular, English describes as irregularities. English has many irregularities in spelling, pronunciation and morphology example: city (n) → urban (adj.). There is no relationship between city as a noun and urban as an adjective.

Neoclassical compounds which are defined as words that consist of two or more bound roots of the classical original (i.e. Latin and Greek) play an important role in forming hybrid pairs. For instance, the word 'biology' consists of the Greek base "bio" and Latin base "logy". The parts of this word are unlike the usual compounds in English because their roots are not free morphemes. So hybrid pairs can be derived from Greek or Latin or by mixing both, since many English words and elements that are bound can be traced back to Greek and Latin. Such words are known as neoclassical

compounds. For instance, "biography" is Greek, "agriculture" is Latin, but "television" is a hybrid of Greek "tele" and Latin "vision". Students should pay attention to the lists of Latin or Greek bases and affixes, in addition to the technical words derived from them. They can acquire the ability to guess the meaning of these words by observing their structure through analysis and studying the irregular derivatives under a Latin and a Greek entry-word, since most of hybrid pairs are structured from Latin or Greek base and stem. Moreover the student should compare irregular derivatives that traced back to foreign elements with which he/she is already familiar.

1.2 Statement of the Problem

Jordanian English and science major students seem to encounter difficulties in recognizing and acquiring hybrid pairs. So this study is an attempt to identify hybrid pairs and the extent of students' familiarity with such hybrid pairs. Finally it offers the best suggested solutions to the difficulties.

1.3 **Questions of the Study**

The study seeks to find answers to the following questions:

1- What makes hybrid pairs difficult to master by English and science major students?

2- What are the suggested solutions to overcome difficulties that English and science major students encounter in learning hybrid pairs?

3- Is there a relationship between specialization and mastering hybrid pairs?

1.4 Purpose of the Study

The primary purpose of this study is to suggest a plan which will hopefully aid in reducing the size of unknown hybrid pairs to the students of science and English, to increase their ability to determine the hybrid pairs by analyzing their structures, and to shed light on the elements and word formation that elucidate the difficulties and the relationship between hybrid pairs.

1.5 Significance of the Study

To the best of my knowledge, this is the first study that deals with hybrid pairs. Thus, it is believed that this study will be significant for English teachers, supervisors, and university students in Jordan in general. Furthermore, this study may benefit lexicographers to fill a gap in the field.

1.6 Limitations of the Study

This study has the following limitations:

1-It limits itself to investigating the formation of hybrid pairs.

2- It is limited to a sample of students of the University of Jordan.

3-The results cannot be generalized as the sample was not large enough to include all Jordanian University students.

1.7 Definition of Terms

The following definitions are adopted through this study:

Hybrid pairs: can be defined as two words (a noun and an adjective) that are morphologically unrelated. The irregular adjectives are often derived from Greek or Latin origins. For instance, the adjective of 'voice' is vocal, since "vocal' is derived from Latin base 'voc', the adjective of 'foot ' is 'pedal' which is derived from Latin base 'ped' and the adjective of 'life' is 'biological' which is derived from Greek base 'bio' and Latin base 'logy'.

Irregular derivations: can be defined as derivatives in English which are not derived from the same root. There is no relationship between "heart" and its adjective "cardiac". In general, irregular noun and adjective do not obey the usual rules for words in the language.

Irregular adjectives: can be defined as an adjective of relation that is not derived from the same root as the corresponding noun. For example, the word "geographical" is considered the adjective of the word "earth", but is derived from the Latin word or base "geo" for earth.

Neoclassical compounds: can be defined as a word formation process that consists of two or more bound roots or bound elements of classical origin (i.e. ancient Greek or Latin). They are considered to be compounds because their

parts are clearly roots rather than affixes. But they do not appear as free morphemes.

Hybrid compounds: can be defined as a word made up of elements or (morphemes) from different languages such as submarine (Latin "sub" that means "under" plus Greek "marine" that means "sea"). Furthermore, combine native elements with bound neoclassical elements the result is sometimes called hybrid formation.

Scientific terms: can be defined as words that consist of combinations of roots, prefixes and suffixes from foreign languages, especially Latin and Greek. Understanding common affixes and roots will help students learn these terms since their morphology may vary across languages and have a very specific and complicated meaning. These terms are classical compounds or derivatives.

Chapter Two

Review of Related Literature

2.1 Introduction

Hybrid pairs have been defined variously and various views on that concept have been given. Nybakken (1959) viewed hybrid pairs as words which did not exist in the parent language from which their elements were drawn. Depending on this phenomenon, there is a review of some available theoretical and empirical studies that illustrate (i) the nature of English vocabulary, (ii) foreign elements in the English language, (iii) Greek and Latin bases, (iv) Greek and Latin derived affixes help students understand hybrid pairs, (v) the role of neoclassical compounds in forming English vocabulary, (vi) scientific vocabulary, (vii) irregular derivatives, (viii) difficulties encountered in learning English vocabulary.

2.2 Review of Theoretical Literature

2.2.1 Nature of English Vocabulary

Williams (1914) illustrated the relationship between English vocabulary and other languages such as Latin. He suggested that most English words are Latin words, since many of them are related to the common occupations of life. He illustrated the relation by giving these examples:

English vocabulary	Latin vocabulary	Latin vocabulary derivation
father	pater	paternal
sea	mare	marine
nose	nasus	nasal

Mcknight (1923) indicated that English has absorbed foreign elements in its vocabulary. Furthermore, he pointed out in this regard:

> *"English has taken thousands of words from the French. Before the conquest, French words had begun to find their way into English such as 'clerk', 'market' are recorded in English literature before the conquest, also French words consisting for the most part of terms such as justice".(Mcknight, 1923:122)*

Adams (1973) argued that English word-formation must take into consideration the hybrid nature of English vocabulary. When linguists study the lexicon, they recognize how vocabulary is stored, structured, created and learn the relationships between words. Also he maintained that many English words and word elements can be traced back to Latin and Greek. However, English has a strong tendency to adopt foreign vocabulary and borrowed words from a variety of sources.

According to Cran (1986) whenever a suitable old English substitute could not be found, a Latin word could be chosen instead and many Latin words entered the old English lexicon in this way. He concluded that many words were borrowed from Latin while others were coined from Latin roots, affixes, and Latin word elements that freely combine with elements from all other languages including Greek and native Anglo-Saxon words.

Knowles (1997) stated:

> *"The history of English is a history of cultural influences from different European nations, thus, [the] English language has not existed in isolation and has always been in close contact with other European languages". (Knowles, 1997:3)*

As it is known, English has experienced three eras of its historical development. Zhuanglling (2001) classified these three eras as Old English from 450 to 1150, Middle English from 1150 to 1500 and Modern English 1500 up to the present times. He discussed the development of English vocabulary through these eras. English vocabulary has been developing continuously. Therefore, the nature of vocabulary development is changing, so as to meet the needs in all walks of life. Vocabulary is not changing at random, but for the feasible use and effectual exchange. Also he stated that English vocabulary is changing and progressing under the circumstances that there has been more intimate link between nations. Here are few examples to illustrate this point:

Old	**middle**	**modern**
mon-a	mone-e	moon
sun-u	sun-e	sun

Crystal (2003) suggested that English speakers not only know words, but they also know how they are formed. In other words, they study the origin of English words and word elements relating to Latin and Greek words that interact with English through religious, scientific and legal terms that is because Latin and Greek were the dominant languages.

Meara (2005) suggested that English seems to have a rich and very large vocabulary. The reason for that is that English vocabulary is a complicated mixture of Germanic words and Romance words. The Germanic words are words which English shares with languages like German, Danish, and Norwegian. The Romance words are words which English shares with languages like French, Spanish and Italian. She proclaimed:

> *"Romance words are further split up into two main groups. Some of these words became part of English at the time of the Norman Conquest, around 1100 AD. The others were imported into English by scholars in the 18th century, directly from Latin, or occasionally from Greek. The result of all this borrowing and adoption of words is that English vocabulary presents a lot of very awkward problems for foreign learners". (Meara, 2005:1)*

According to Elly Van (2006) the nature of English vocabulary has

a double set of words and he illustrated that through the following examples:

Perspire ---------- sweat

Donate ---------- give

Narrate ---------- tell

As result of previous studies, English has integrated words from many languages in its span of existence, and vocabulary-word formation comes in all sizes and degrees of difficulty from numerous languages past and present. Trayler (2007) in his dictionary, The Concise Dictionary of English Etymology illustrated the word Solar as follow: Solar, belonging to the sun (L.) L. solaries, solar. = L.sol, Sun + Icel. Sa'l, Goth. (Trayler, 2007:472).

2.2.2 Foreign Elements in the English Language

Sergent (1873) was concerned with the greater part of foreign words that have been incorporated into English, maybe divided as follows:

1. Words of Celtic origin.
2. Words of Scandinavian origin.

3. Words of Greek origin.
4. Words of Latin origin.

Most of the terms employed in art, science, mental and moral philosophy, are from Latin and Greek.

5. Words of miscellaneous origin. Some of these miscellaneous elements are important enough to be noticed separately, examples:

   1) Hebrew 2) Arabic 3) Persian 4) Hindustani

   5) Malay 6) Chinese 7) Turkish 8) Polynesian

   9) Italian 10) Spanish 11) French 12) Dutch

The number of foreign words in the English language is probably about eighty-five thousand (85,000).

Dennis (1960) indicated:

> *"English is derived from the Germanic and contains many words from Latin, Greek, French, German and other languages". (Dennis, 1960:28)*

Klein (1966) argued that words are not only the elements of a language but also of the history of the people speaking it. They are important milestones along the way leading to the majestic Palace of Human Knowledge.

Albert and Cable (1978) defined English as the language of a group of Germanic tribes (example: the Franks, Goths, Angles, Saxons, vandals and Lombards) after they arrived in Britain.

They also claimed:

> *"The Roman Christianizing of Britain in 597 brought England into contact with Latin civilization and made significant addition to our vocabulary'. The Latin influence of the second period was not only extensive but thorough and marks the real beginning of the English habit of freely foreign elements into its vocabulary". (Albert and Cable, 1978:2)*

They concluded that classical language is a dead language because it has not changed for 2,000 years. Much of the vocabulary of old English has been lost

Pyles and Algeo (1982) illustrated that English vocabulary owes most of its words to foreign languages, which came to settle in English through borrowing all of foreign languages from which English has borrowed words, Latin, Greek, (most of Greek words have entered into English through Latin), French into English began much later than Latin and Greek but French words swarmed into the English language at such great speed that no other language could compare with it. According to these languages, vocabulary has an important significance to English vocabulary learning. They argued that there are four elements in the English vocabulary. (i) Latin (ii) Greek (iii) French (iv) Scandinavian. They also suggested that most of abbreviations are from Latin, examples:

a.m → before
p.m → afternoon
etc → and so on

It is estimated that at least 900 words of Scandinavian origin have survived in modern English such as skirt, skill.

They concluded that the Latin element in the English vocabulary came in through Celtic transmission since there was no opportunity for direct contact between Latin and Old English in England.

In 1988, the editor of Chambers Dictionary of Etymology illustrated the history of words. For example the word 'oral' is explained as follows:

Oral adj. 1625, done with the mouth (but implied earlier in orally, 1608); perhaps later reinforced in English by French oral, but borrowed from late Latin ōrālis, from Latin ōs (genitive ōris) mouth. Latin ōs is cognate with Sanskrit ās, Hittite ais, and middle Irish ā (genitive, singular), all meaning mouth, as well as with Old Icelandic ōss mouth of a river, from Proto-Germanic ōsaz, ultimately from Indo-European ō(u)s (Champers,1988:733)

Abderrahman (1991) suggested that many words are borrowed from Arabic language. The English word algorithm, which is an antonomasia is derived from the Arabic 'Alkhawarizmi', the founder of that branch of science used nowadays in Arabic as, "Lugaritmat".

Peters and Salloum (1996) illustrated the impact of Arabic on the English vocabulary and pointed that English words of Arabic origin which include about 3000 entries with another almost 4800 derivatives for a total of 7800 English words are all of Arabic origin. Also they indicated that Arabic is the 7th on the

list of languages that have contributed to the enrichment of the English vocabulary.

Zahoor and Haq (1997) argued that orange means naranj, an Arabic word descending from Sanskrit narange = orange. The orange tree came from India.Most of the names of stars, mathematical and medical vocabulary are borrowed from Arabic.

Latinized / English name	**Arabic name**
Algebra	al-Jabr
Algorism, Algorithm	Al-Khawarizmi
Zenith	samt*
Azimuth	Al-sumut
Cipher, zero	sifr

Arabic name	**Latinized / English name**
Jabir Ibn Haiyan	Geber
Al – Khawarizmi	Algorism
Al – Razi	Rhazes
Ibn Sina	Avicenna

* the point of the heavens directly overhead. (F.-Span.-Arabic)

2.2.3 Greek and Latin Bases

Jespersen (1982) stated:

> *"Although Latin has been read and written in England from the Old English period till our own days, so that there has been an uninterrupted possibility of Latin influence on the English language, yet we may with comparative ease separate the latest stratum of loans from the two strata that we have already considered. The words adopted are not all of Latin origin, there are perhaps more Greek than Latin elements in them, if we count the words in a big dictionary". (Jesperson, 1982:114)*

Nagy and Anderson (1984) estimated that fifth graders encountered 10,000 new words each year in their reading alone. Fortunately, 4,000 of the 10,000 new words that fifth graders encounter are derivatives of familiar words, most of them of Latin or Greek origin (usually compound words and words with prefixes and suffixes). On the other hand, they illustrated that many English words have cognates in other languages. Spanish speaking students can easily relate many new English to Spanish because they share Latin derivatives.

They explained the role of Latin and Greek bases in forming hybrid pairs through dividing the word to its parts (Nagy and Anderson, 1984:23).

Here are a few more examples of bases:

tract = 'pull, draw, dray'.

duc, duct = 'lead'

port = 'carry'

dic, dict = 'speak'

voc, vot = 'call'

vive, vit = 'life'

sol, helio = 'sun'

aqua, hydro = 'water'

Latin bases:-

Ayers (1986) claimed that root is the generic term for any part of a word that holds meaning, prefixes, suffixes and bases are kinds of roots. Also he stated:

> *"Many of the longer and more difficult words of the English vocabulary are compounds formed from several individual elements. These elements are of three kinds, known as bases, prefixes, suffixes. Latin bases are Latin words as they appear in English derivatives without the various characteristic Latin endings, ¯us, ¯a, ¯um." (Ayers, 1986:27)*

He also illustrated that Latin bases appear in English without the addition of any prefix or suffix, sometimes a base all by itself is a word like 'firm'

base	***meaning***	***English word***
firm-	stable	firm

Sometimes silent –e is added to the base:

base	***meaning***	***English word***
grav-	heavy	grave

The more Greek and Latin word bases you know the better you will be able to guess the meaning of unfamiliar words that are derived from Greek or Latin.

Latin – Greek:

Sometimes English got two alternate forms of the base – one directly from Latin and the other via French.

Latin base	**French**	**meaning**	**English derivatives**
grav-	grieve	heavy	grievous

(Ayers, 1986: 29)

Latin base	Meanings	English derivatives
alien-	of another	alien
art-	art, skill	artifact
fin-	end, limit	final
verb-	word, verb	verbal
vest-	Garment	vestment
nul(l)-	Nothing	null, annul

Krill (1990) mentioned that the vocabulary of Greek and Latin has long been used to shape the professional terminology of numerous subject fields in English, examples:

Transliteration	Meaning	Greek derivative
ge-	Earth	geological
kardia-	Heart	cardiac
kephale-	Head	cephalic
phone-	voice, sound	phonetics

(Krill, 1990:30)

He also claimed that the word propassible (before effect) will not see in English dictionary but its analysis will help to understand it. Its etymological history is as follows:

The prefix pro → comes from Latin word pro means before

The suffix ible → comes from Latin word ible

The base pass → comes from Latin word passus means to go.

The word elements "alg" and "gastr" come from Greek words algos meaning pain and gaster meaning Stomach → gastroenteralgia which means pain in stomach.

Green (2008) stated:

> *"When to different English word derive from the same root and have similar meanings but different English spellings, they are called doubts occur when a Latin root comes into English in two different ways: directly from Latin and through an intermediary language, such as French, as well. Example: Royal and regal both derive from Rex, Regis = king". (Green, 2008:26)*

She tackled the relationship between a Latin and English derivative through these examples:

English derivative	Latin adjective	Latin stem	English meaning	Latin noun
urban	urbanus	urb-	city	urbs
vocal	vocalis	voc-	voice	vox, vocis
marine	marinus	mar-	sea	maris, mare

(Green, 2008:44)

Rasinski, Padak, Newton (2008) explained how to help students understand the meanings of word parts in order to learn new words. They stated:

1. *You should know that 90 percent of English words with more than one syllable are Latin-based and most of the remaining 10 percent are Greek-based.*
2. *You should know that a single root can help us understand 5-20 related English words. (Rasinski, Padak and Newton, 2008:7)*

They argued that by separating and analyzing the meaning of a prefix, suffix, or other word root, students can often unlock the meaning of an unknown word. They concluded that many English words can be divided into three parts, the prefix, the base and the suffix. They illustrated what does a base do, by giving these examples:

The root mot is a base that means move.

The root viv, vit are bases that mean life.

The root aqua,hydro are bases that mean water. (Rasinski, Padak and Newton, 2008:33)

2.2.4 Greek and Latin Derived Affixes Help Students Understand Hybrid Pairs.

As mentioned earlier, most words in English are made up of roots, prefixes and suffixes. But suffixes are complicated since they can be used in four different ways, to make nouns, adjectives, verbs and adverbs.

John (1953) defined suffix as an inseparable form that cannot be used alone but that carries an indication of quality, action, or relation. When it is added to combining form, it makes a complete word and will determine whether the word is a noun, an adjective, a verb, or an adverb. And he defined prefix as adverbs or prepositions derived from Greek or Latin that cannot be used alone in English and appear at the beginning of words.

He also mentioned that there are some prefixes and suffixes that are related to Greek and Latin origin, and knowing building of the English language, prefixes, suffixes and roots help you to understand word's meaning and spelling convention. These are some examples:

prefix	***meaning***
bi-(L)	twice
contra-(L)	against
anti-(L)	against
di-(L)	twice

root	***meaning***	***example***
bio(G)	life	biology
ped(L)	foot	pedal
min(L)	small	minimal
geo(G)	earth	geografical

As it is known English is a living language, and is growing throughout time. New words are created when words or word elements, such as roots, prefixes and suffixes, are combined in new ways. Borror (1960) illustrated affixes, word roots and combining form. For examples:

Prefix	***meaning***	***examples words***
sub-(L)	under	submarine
micro-(G)	small	microscope

According to Ayers (1986) Latin prefixes are used freely in making new English words, and he illustrated that by these examples:(Ayers,1986:42-43)

examples	meanings	prefix
expel, evade, efficient	out, from, completely	ex-, e-(L), ef-
expect[1]	to look	ex- + aspect(L)
submarine	under	sub(L)
amoral	without	an- (G)
antagonist	against	anti (G)
amphibious	around, both	amphi (G)
allusive[2]	point/mark	ad-(L)

Also he added that many English words of Latin origin have been formed by the addition of suffixes. For example: (Ayers, 1986:60)

English derivatives	suffix	meaning	base
vocal	-al	voice	voc- (L)
popular	-ar	people	popul- (L)
barbarian	-ian	foreign	barbar- (L)
biological	cal	life	bio (G)
cosmic	-ic	universe	cosm-(G)

He concluded that by developing techniques of word analysis, students will acquire a valuable method for tackling unfamiliar words of Latin or Greek origin. If they break them down into base, prefix and suffix, they will be seen less strange and puzzling. Furthermore, after analyzing unfamiliar words, they will find them much easier to remember.

---

(1) In English, when ex- precedes a base beginning with's' the letter's' is dropped.

(2) The letter d in prefix ad- is dropped and double the consonant letter for correct pronunciation.

Marriam Websters' dictionary (2004) is able to offer a good deal of historical information about words. For instance:

Aerial → / e[1]r-ē-əi, ā-ir-ē-əi/adj [L.aerius, GK.aerios, Fr.aēr] (1604): the meaning → existing or growing in the air rather in the ground or in water. In this example she mentioned that aerial is an adjective but she ignored the noun of this adjective.

Rasinski, Padak, Newton (2008) illustrate that when a prefix is attached to the base of a word, the prefix does one of three things: it gives a word direction, negates word by meaning not or intensifies the meaning of a word by adding the notion of very. For example: the prefix sub- means under in the word submarine.

They also argued:

> *"Words of Greek and Latin origins, for example tend to be long and often carry technical meanings. Thus it can be useful to students to learn that the suffix –logy means study of. By dividing and conquering this suffix they will be able to think about the base meaning in such words as: Geology is the study of the earth. Theology is the study of God". (Rasinski, Padak and Newton, 2008:37)*

2.2.5 The Role of Neo- Classical Compounds in Forming English Vocabulary

As mentioned earlier, scientific terms are originally based on Latin or Greek word elements and are usually referred to English literature as neo-classical compounds. It is common to find compounds formed from Latin or Greek roots in scientific language. According to Bauer (1983) neo-classical compounds contain at least one initial or final morpheme of Greek and Latin origin. He analyses and defines neo-classical compounds as many roots from Greek and Latin origins but do not occur as words by themselves. Neo-classical compounding is the formation of words like, 'coprolite', psychology 'which are created in modern times using elements from the classical languages Latin and Greek. These words are considered to be compounds because their parts are roots rather than affixes, but they are unlike the usual compounds in English because their roots are not free morphemes. (Bauer, 1983:2010-2013)

Jackson and Amrela (2000) claimed:

> *" Most classical compound translate reading into everyday language, especially nouns, for instance*
>
> *bio - means life* ⟹ *biography*
>
> *graphy means writing description" (Jackson and Amrela, 2000:82)*

The issue of compounding has proved much more complicated. In fact, Plag (2003) is right on the mark when he stated :

> *"Although compounding is the most productive type of word- formation process in English it is perhaps, also, the most controversial one in terms of its linguistic analysis and I must forewarn readers seeking clear answer to the question that compounding is a field of study where intricate problems abound problems remain unresolved, and convincing solutions are generally not so easy to find". (Plag, 2003:132*

Baeskow (2004) investigated the difficulties to determine neo-elements, because they semantically behave like stems but often they appear only as bound forms. So he defined neo-classical compounds as the combination of neo-classical origins. According to Baeskows' analysis when these bound bases are selected by suffixes; they give rise to full words like 'biology' zoological, and submarine.

2.2.6 Scientific Vocabulary

As a result of innovation and linguistic prosperity and the spread of the scientific terms, it has become important to enrich the English scientific vocabulary especially hybrid pairs and above all, offer solutions that suit the needs of English and science major students.

Nybakken (1959) argued that all scientific names of plants, bacteria, and animals have been Latinized and are, therefore, in effect, Latin words whose structure, inflection, and syntax are governed by rules of classical Latin. He also suggested some ideas for manipulating scientific terminology:

1. Major attention should be given to the lists of Latin and Greek words and scientific terms derived from them.

2. Matching scrambled terms and definitions.

3. Selecting the correct definition of a particular scientific word from among several suggested definitions of it. (Nybakken, 1959:ix-2)

He concluded that most of the technical words that are used in medicine and dentistry have their origins in the Greek and Latin languages, and over two-thirds of present-day medical English is derived from Greek alone. He illustrated that by giving these examples: (Nybakken, 1959:24)

English derivative	Word	Latin
agriculture	Field	ager
annual	Year	annus
armiger	Weapons	arms
factual	Done	factus
caesura	Cut	caesum
claustrum	Closed	clausum

Flood (1960) illustrated that many scientific words are logically built up from simpler word-elements (usually of Greek or Latin origin) and the general meaning of the whole can be inferred from an understanding of the parts. Even if scientists know little of the classical languages, they can easily learn to translate the scientific terms which they meet.

Theodore and Berkowits (1967) dealt with a major problem that encounters the students in the field of science. They stated:

> *"One reason so many persons entering the field of science become convinced that the subject matter is extremely difficult and far beyond their ability is that there is a scientific vocabulary which must be mastered". (Theodore and Berkowits, 1967:1)*

They elaborated on the characteristics of scientific vocabulary and claimed that scientific vocabulary and technical terms are often long and complicated words. They also recommended that if one has an understanding of the roots of words, these terms need not be fearful.

Simpson (1968) analyzed how scientific terms can be made of Greek, Latin or both mixed together. For instance:

- Tel- → Greek root means 'far'
- Phone- → Greek root means 'sound'

The two roots join together to form 'telephone' but vowel 'e' is added between telephone for correct pronunciation.

He also added that scientific terms often use prefixes and suffixes to provide additional information to the stem component of a term.

For instance: Pre fix.

Fix → is a word root from the Latin 'fixus' which means 'fasten'.

Pre → is a prefix from the Latin 'phrase' which means 'front' or 'before'.

These are common roots, suffixes, and prefixes in science selected from 'Simpsons' dictionary.

Common roots in science and their meanings:

- bio → life
- zo → animal
- geo → earth

Common suffixes:

- -tomy → cut
- -oid → like
- -ism → condition
- -algia → pain

Common prefixes:

- micro- → small
- pro- → before
- ab- → away from
- macro- → large/big

According to Ayers (1986) scientific words are unfamiliar and are employed by specialists who know that application tends to keep their meaning precise. He claimed:

"The word 'allergy' is a good example of this. In medicine it refers to an abnormal sensitivity to certain substances which are harmless to most people; but it is used by non-physicians loosely to mean indigestion or simply dislike". (Ayers, 1986:57)

He also cleared the suffixes that are used in scientific terminology.

-in, -ine → means 'chemical substance' (of Latin derivation).

Melan- → means black, dark + -in → melanin [(1).]

In addition to knowing Latin and Greek suffixes, prefixes and irregular derivatives to form scientific vocabulary, Barnhart (1988) argued that forming scientific terminology requires knowing irregular inflectional forms such as plural and singular. Example:

English derivation	Noun/plural	Noun/singular
diagnostic	diagnoses	diagnosis
protozoon	protozoa	protozoon
vertebral	vertabrae	vertabra

(1) A dark pigment found in skin, hair, ….

Raad (1989) pointed out:

> *"Thirty-five years ago, scientific vocabulary was described as nearly one hundred percent Latin or Latinized Greek". (Raad,1989:128)*

In view of the importance of scientific vocabulary Morris (2004) suggested some rules to learn them:

1. Create your own vocabulary lists of words that you are not familiar with and put some time and effort into learning them.
2. Remember the more senses you use in learning new words, the better chance you have of remembering them.
3. You may Categories words, for example, by structure (focus on term), or by origin, (Greek, Latin or French).
4. Use new or unfamiliar words, when you think, speak, read and write about your academic work.
5. Finally, you may use a game to learn your words.

Holmboe (2005) concluded that the teacher needs to be alert and able to adapt the way he/she uses scientific language in interaction with the students. The teacher's responsibility in this sense is twofold. First, he/she offers an invaluable bench mark or point of reference for the students as they develop their own version of the scientific discourse. Second, the teacher needs to adapt to the discourse of the classroom as it evolves.

6. Elias (2006) indicated that science terms made easy both saves time by avoiding rote memorization and encourages students to use their analytical skills to figure out meanings.

2.2.7 Irregular Derivatives

An irregular derivative is an adjective of relation that is not derived from the same root. In many such cases, the regular adjective is the one in every day use; the irregular form is either a technical usage or is used for effect.

Students used to get wide exposure to the etymology of English when translating into and out of Latin and Greek. The advantage was summed up by Carroll (1940) as follows:

> *"Knowledge of word derivation as a mnemonic device has often aided the writer in retaining the meaning of unusual words". (Carroll, 1940:110)*

Jespersen (1982) pointed out:

> *"There is one class of words which seems to be rather sparingly represented in the native vocabulary, so that classical formations are extremely often restored to namely the adjectives. It is, in fact, surprising how many pairs we have of native nouns and foreign adjectives, example: mouth: oral; nose: nasal; eye: ocular; mind: mental; son: filial; ox: bovine; worm: vermicular; house: domestic; the middle ages: medieval; book: literary; moon: lunar; sun: solar; star: stellar; town: urban; man: human". (Jespersen, 1982:132)*

Stagebery and Oaks (2000) illustrated that etymology deals with the origin or derivation of words. When students know the meaning of a Latin or Greek root, prefix, or suffix, they can better understand, and easily remember, all the words built on this Latin or Greek element.

Finch (2000) claimed that English has many irregular forms, creating challenges for linguists who study morphology.

Katamba (2005) explained that word-formation involves two main processes: inflection and derivation. There are two major classes of derivational processes, affixation and conversion.

Algeo (2010) claimed that the reason for studying the history of English is that many of the irregularities in today's language are the remnants of earlier, quite regular patterns.

Collins English Dictionary (2011) illustrated the irregular adjective through some words such as:

Cardiac (adj) of or relating to the heart [Greek kardia heart]

Aqueous (adj) (1) of, like, or containing water (2) produced by the action of water [Latin akua water] (Collins, 2011:42,143)

2.2.8 Difficulties Encountered in Learning English Vocabulary

Nybakken (1959) focused on the solution that helps students to master the derivatives under Latin and Greek. He stated:

> *"when studying the derivatives under a Latin or a Greek entry-word, the students should concentrate his first attention on those derivatives with which he is already familiar; after that, he should take special note of those terms which incorporate word elements that have been studied or which will be included in the first (and second) "round"; and finally, he should study the remaining derivatives under the entry-word". (Nybakken, 1959: x)*

He also argued that learning Greek and Latin roots, stems, and affixes which recur most often in the technical terms of medicine and biology for instance.

Derivatives using base	Base	Stem	Greek or Latin word
Lactary	Lact-	Lact-	Lac,Lactis,milk
Mensal, commensal	Mens-	Mensa-	Mensa, mensae, table

According to Nybakken, derivatives are words obtained from other languages by combining several foreign word elements into new words- for Example:

Derivatives	Foreign words or word-elements
Ocular	Ocularis(pertaining to the eye)

Furthermore, he illustrated hybrid words as once constructed from elements derived from more than a single language for example; tele- (Greek, far off) plus vis- (Latin, see) = television determined that words constructed from Greek or Latin elements generally have the advantage of being recognized as technical terms. (Nybakken, 1959: 4,7,8,28)

Corson (1995) claimed:

> *"High value was placed on the daily use of Latin for all spoken purposes and on the rigorous study of Greek. It then became the basis for a greatly enlarged English vocabulary drawn directly from those languages". (Corson, 1995: 6)*

Holmes (1995) demonstrated that knowledge of Latin and Greek roots improves the English skills of students through a broad range of grade levels. He

concludes that Latin adjectives can present problems for those not well acquainted with the language. For many people English is a big challenge. English seems to be a difficult language to master with all its irregularities. English is not a pure language because it came from deferent sources such as, Old English and Old Saxon. English presents a number of issues to non-native speakers. It is grammatically unlike other languages even those from which it has borrowed large vocabulary groups, and processes a number of irregularities. Understanding these features of English may help the non-native speaker grasp the language and why learning English can be so difficult. Three critical problems in English:

1- English has been borrowed many vocabularies from different languages.

2- Lack of learner motivation.

3- Insufficient time, resources and materials.

Corson (1997) argued that many students from some cultural, linguistic and social backgrounder encounter difficulties in using English for academic purpose. Also he cleared the importance of morphology in processing complex words. The conclusions about word morphology are relevant because differences in morphology are basic to the differences that exist between the two main word types in English, the Graeco – Latin and the Anglo – Saxon. For most speakers of English, specialist Graeco-Latin words have lost their

transparency. They no longer carry much perceptible meaning that comes from their component parts.

In summary, the attributes of Graeco – Latin word difficulty are as follows: They are usually non-concrete, low in imagery, low in frequency, and semantically opaque. The low frequency of most Graeco-Latin words in the language would slow their activation for all users who meet them infrequently.

Hennings (2000) claimed that to help students learn word clusters, teachers should guide students to highlight Greek and Latin roots as they occur and use Greek and Latin roots to connect new words with already familiar words, because word derivation in English requires a lot of root learning.

Plag (2003) stated:

> *"The term root is used when we to explicitly refer to the indivisible central part of a complex word. In other words the study of word- formation can thus be defined as the study of the ways in which new complex words are built on the basis of other words or morphemes". (Plag, 2003:11)*

Davidson (2008) maintained that the history of English has resulted in a very large vocabulary, essentially one stream from old English and one from the Norman infusion of Latin derived terms. Furthermore it is claimed that English has one of largest vocabularies of any known language.

Rasinski, Padak and Newton (2008) aimed to show readers how to help students understand the meaning of word parts in order to learn new words especially that some words are new and many have no everyday equivalents. They

concluded that learning to recognize roots and affixes help students build their vocabulary and improve their ability to guess unknown words. Moreover, studying word roots may start students on a fascinating exploration of word histories. For example; the words ‘vocabulary’ and vowel come from the Latin root ‘voc’, which means ‘voice’. Researchers agree that a focus on Greek and Latin derivatives offers a powerful tool for teachers to nurture students' vocabulary development. Also, when they applied this study on fifth graders, they found that 4,000 new words are derivatives of unfamiliar words, most of which are Latin and Greek origin. This is why a focus on word parts makes sense as part of vocabulary program.

2.3 Review of Empirical Studies

2.3.1 Suggested Solutions for Learning Hybrid Pairs Easily

Science has complex vocabulary that is not only difficult for Arab learners of English but also for native English speakers. But it will be easy for both if they have knowledge of Greek and Latin prefixes, suffixes and roots which enhance student understanding of hybrid pairs.

In support of the great value of scientific vocabulary to everyone, Asimov (1959) argued that far from frightening people keep away from science. The scientific vocabulary understanding should be one of the most powerful attractions of science. One reason that science is considered a hard subject is the scientific vocabulary, because they have the same meaning today as yesterday, any nationality can comprehend the meaning of science words. Since they no longer study Latin and Greek in school, actually discovering the meanings of words is still an exciting process of discovery. In this inimitable way, Asimov makes words of science both fun and informative.

Dennis (1960) investigated the major problem that students face in learning scientific vocabulary. He claimed:

> *"Biological terminology is often a source of difficulty and frustration for students. Since most roots used in biological terms are derived from Latin or Greek. Scientists have made much use of both Greek and Latin roots to form combinations to produce new words for unknown phenomena". (Dennis, 1960:24).*

But he did not ignore the solution for this problem, so he stated that Students should learn to recognize word parts since they often give them a clue to the meaning of the word, for example; the word from – bio- will refer to life whenever it is used. Word analysis will be a very useful tool because it will often give them a good idea of the meaning of words.

The study showed that scientific vocabulary can be learned and understood more easily if one understands how words are derived and constructed.

Hayes and Ahrens (1988) counted the proportion of 'rare words' that appear in different kinds of language. The words themselves were overwhelmingly Graeco – Latin and the authors found that printed texts provided much more exposure to these words than oral ones. For example, even children's books contained 50% of rare words.

Anglin (1993) in his sample he argued that few words were drawn from the Graeco-Latin vocabularies of English so characteristic of academic meaning system. These Graeco-Latin words, which make up more than half the vocabulary of English are rarely recognized, used or understood by pre-adolescents.

According to Olson (2002) the problem of rapid vocabulary building may be approached in a number of ways. One, exposing the students to a selected list of basic Greek and Latin stems and roots and then encouraging them to break down each new word into its basic parts, for example; take the word chlorophyll which was derived from the Greek words green, and phyllon meaning leaf. Greek & Latin root words are commonly used in forming scientific terms.

Studying Greek and Latin roots can improve and increase hybrid pairs. In a study titled "Increasing Word Power for Culturally and Linguistically Diverse Students with Greek and Latin Roots" by Clayton (2003) the first goal of the study was to recognize root words, and then apply those roots to learning English derivatives. His findings were as:

> *"When I presented students with the root bon / bene they predicted that "bon/bene" means "important" or "connection" and one student thought it meant 'bone'. One student reflected that this lesson was hard. Students also came up with 'bonus' and bountiful when asked to come up with words using bone/bene. This exercise provided good practice for the class because they had to break the words down into prefixes, suffixes and bases". (Clayton, 2003:5)*

He also found that the improvement in reading comprehension for the group that studies Greek and Latin roots was not significant. One of the most important things he found was that students were sounding out words and breaking them down into prefixes suffixes and roots more than ever.

2.3.2 How English Became English

In his study, Miller (2006) aimed at exploring the rich variety of English words formed by the addition of one or more Latin suffixes, such as ial, -able, - ability, - ible, and – id. It traces the histories of over 3.000 words and reveals the range of derivational patterns Indo- European, Latin, and English. It makes an important contribution to the history of English and Latin morphology and etymology, as well as to the history of suffixes derivation in Indo –European.

Henry (2008) showed that the reasons for English's vast borrowing include the existence of other languages native to Britain.

The existence of England by the Vikings and the Normans, and continuing French influence:

- Borrowings and new coinages from Latin and Greek, and in other European language.
- Cultural openness to borrowing.
- Its modern global importance.

Henry Conducted a study that aimed at demonstrating how English became English.

English has many loanwords. In 1973, a computerized survey of about 80.000 words in old shorter Oxford Dictionary (3rd edition) was published in Ordered Profusion by Thomas and Wolff. They claimed that the origins of English words were as follows:

- French and Norman, including old French, old Norman, Anglo-French and Anglo-Norman: 28.3%.
- 28.24% of Latin words, including modern scientific and technical Latin.
- 25% of Germanic languages including Old and Middle English.
- 5.32% of words are Greek.
- 4.03% of words no etymology given or unknown.
- 3.28% are derived from proper names.
- All other languages contributed less than 1%

2.3.3 The Role of Textbooks in Learning Scientific Vocabulary

Henno and Reiska (2010) illustrated the important role of textbooks in science classrooms. Studying science requires an understanding of two things: terminology and concepts. Science achievement and self-concept are key components of scientific literacy. The study of this research took place

during the school year 2008/2009, on the twelve grade students taught by two biology teachers.

For this survey the students were asked to bring out all unknown concepts. The study revealed that students had difficulties with identifying the meaning of more than 15 terms in the text out of twenty terms. The researcher found that the studies made in the field focused on scientific vocabulary, so students cannot guess the meaning of fifteen words because these words are unfamiliar and seem to be strange.

2.3.4 Conclusion

Depending on the literature reviewed in this chapter, the researcher came to the following conclusions concerning the study of hybrid pairs; First, English language has its roots from several languages including Greek, Latin, French and German. However, English has a strong tendency to adopt foreign vocabulary from variety of sources.

The second conclusion concerning the knowledge of Latin and Greek is the basis of advanced English vocabulary technical and scientific terms. These words are not learned from normal reading, but they may be learned through hard practicing in ancient prefixes, stems and suffixes. Students who acquired a powerful foundation of hundreds of Latin and Greek elements

making it possible to understand and remember thousands of technical words of which most are hybrid pairs.

Finally, the researcher found that the studies made in the field were not sufficient as they all focus on scientific and technical vocabulary since these terms are formed from Latin and Greek roots and affixes. In other words, previous studies have not shown the relationship between these terms and their derivation. For example, what is the relationship between ‘sister’ as a noun and “sororall” as an adjective? Most of the studies indicated that learning etymology of words help students to master unknown terms.

Chapter Three

Methods and Procedures

3.1 Introduction

This chapter is concerned with research methodology and research tools used in this study to describe the population, the sample of the study, instrumentation of the questionnaire (data collection, data analysis), validity and reliability of the research instrument, and finally procedures of the study. Likewise, the chapter presented how the research will be implemented and how to come up with pertinent findings.

This study entitled 'Difficulties Faced by Jordanian English and Science Major Students in Learning Hybrid pairs, attempt to accumulate existing information and data regarding the difficulties of learning hybrid pairs and suggested solutions in order to deliver a detailed description.

3.2 Population of the Study

The population of the study represents the university of Jordan students in Jordan. The population of the study is classified according to specialization which consisted of English and science major students, of the highest level.

3.3 Sample of the Study

The sample of the current study consisted of two hundred participants randomly drawn from the population. The sample included both genders: females and males. Moreover, the sample is classified according to specialization which is distributed as follows: forty of them were science major students including

biology, medical analysis, chemistry and physics. And eighty of them were English major students. Moreover eighty of them were medicine major students including medicine pharmacy, doctor pharmacy and dentistry. Table (1) shows the distributions of the sample of this study according to specialization.

Table (1): Distribution of the sample according to specialization

Specialization	Frequency	Percentage %
Medicine		
-Medicine	20	10.0
-Dentistry	20	10.0
-D. pharmacy	20	10.0
-Pharmacy	20	10.0
Total	**80**	**40**
Science		
-Biology		
-Medical analysis	10	5.0
-Chemistry	10	5.0
-Physics	10	5.0
	10	5.0
Total	**40**	**20.0**
English	80	40
Total	200	100.0

3.4 Instruments of the Study

- The study used a questionnaire, diagnostic vocabulary tests and semi-structured interviews for collecting data which were designed to address the questions of the study.

3.4.1 Questionnaire

The researcher prepared a questionnaire which was created specifically to meet the requirements of the current study. The questionnaire consisted of two parts developed by the researcher to achieve goals of the study. It was written in simple English to avoid any misunderstanding. In addition, it was designed according to specializations. Two hundred participants from the University of Jordan holding B.A in science and English language were requested to answer the questionnaire. A five-Likert scale was used for responding to fill the number that corresponds to difficulties and suggested solutions in learning hybrid pairs according the following scale: Strongly disagree, disagree, uncertain, agree and strongly agree.

Moreover, the questionnaire consisted of two dimensions; the first one which included twenty items meant to know the difficulties that encounter students in learning hybrid pairs (See Appendix 6, p.131-133), the second consisted of ten items which aimed at offering suggested solutions to reduce the difficulty of learning hybrid pairs (See Appendix 7, p.134).

3.4.2 Diagnostic Vocabulary Tests

This test was the biggest; it consisted of six sections, each one aimed at elaborating the difficulties and if there is a relationship been specialization and learning hybrid pairs. Moreover, the sections A.B.C.D.E.F were entitled as follows:

- Section (a), match the nouns with their irregular derivatives. This section consisted of thirty (30) items (See Appendix 8, p.135).
- Section (b), match the adjective with its animal name. This section included thirty (30) items (See Appendix 9, p. 136).
- Section (c), fill in the blanks. This section included thirty (30) items (See Appendix 10, p.137-138).
- Section (d), write (√) or (ᚷ) (See Appendix 11, p. 139). This section included thirty (30) items.
- Section (e); match the irregular adjective derivatives with their nouns. Here the students were asked to match thirty (30) adjectives to thirty nouns (See Appendix 12, p. 140).
- Section (f), the last section, and it included fifteen items. Participants were asked to match medical names with medical adjectives (See Appendix 13, p. 141).

In general, these sections aimed at knowing the difficulties beyond learning hybrid pairs and in particular to know if there is a relationship between learning hybrid pairs and specialization.

3.4.3 Semi-Structured Interviews

Moreover, and based on professors and doctors experience in teaching English, the following questions were asked (See Appendix 4,p.128-129).

1- Does the questionnaire measure how difficult it is for Jordanian English and science major students to learn hybrid pairs?

2- Does the questionnaire have enough items and questions to determine difficulties of learning hybrid pairs?

3- Do you have any suggestions or comments that help improve this study?

In fact the researcher interviewed five experts; she asked the interviewees three questions in order to gather more information. The questions were related to the difficulties that English and science major students encounter in learning hybrid pairs. Absolutely these interviews helped the researcher to compile more information that she could not collect before.

3.5 Validity of the Instrument

Due to the importance of the study, a panel of six experts (two professors and four doctors in teaching English language) was asked to determine validity of the instrument through reading the questions to secure that the questionnaire and diagnostic vocabulary tests measure what they were supposed to measure.

The panel members from The University of Jordan, Al-Isra University, Al-Zaytoonah private University of Jordan, Al-Ahliyya Amman University and Middle East University determined the validity of the questionnaire and tests. They noted that the questionnaire and diagnostics tests are comprehensive and convenient to the purpose of the study. Their comments and suggestions were taken into consideration. Some changes were made in the wording of some items; few items were deleted and others were added (See Appendix 3, p.127).

3.6 Reliability of the Instrument

To enhance achieving a high degree of reliability of the instrument, the researcher used test-retest. The questionnaire was pilot-tested on a group of twenty Jordanian students from the University of Jordan who were not members of the sample. The study computed the results of the pilot test and compared them to the results of current studies.

Hence, there were similarities between results. So when a research project is replicated and yields the same results, then the assumption proves that the research is reliable.

3.7 Procedures of the Study

3.7.1 Data Collection

– After specifying the topic of the study, the researcher looked for various relevant references and did a wide comprehensive reading to mastering hybrid

pairs. Since these studies provided the researcher with information which is considered the first step for reaching the roots of the current study, as the researcher's knowledge no one wrote about or discussed this topic before (i.e. hybrid pairs) not only that but also most of textbooks ignored this essential topic.

– The researcher has randomly selected the sample and determined the instrument of the study.

– In view the importance and significance of the study, the researcher chose the instruments that covered the requirements of this topic which were questionnaire, diagnostic vocabulary testes and semi-structured interviews. In fact, diagnostic vocabulary tests were selected carefully and written in different ways to focus on all aspects of the study.

– The validity of instruments was achieved by asking a panel of two professors and four doctors specialized in teaching English language to determine the suitability of the items and questions for the study.

– To determine the reliability of the instrument, the researcher asked twenty M.A students who were not part of the sample to answer the questionnaire and diagnostic vocabulary tests.

– A letter of permission was obtained from the Middle East University to assist the researcher (See Appendix 1, p.123).

– A letter of permission was obtained from the University of Jordan to facilitate the researcher's task (See Appendix 2,p.124-126).

– The researcher correlated the questionnaire and tests to the current study by relating them to the previous studies. The questionnaire and tests were distributed by the researcher herself. To motivate the students to answer the questionnaire and tests seriously, the researcher visited the students during their class time. They were also given enough time to fulfill and absorb the questions.

– To achieve the objectives of the study, the data were collected through a questionnaire and diagnostic vocabulary tests. The data were recorded, analyzed, interpreted and tabulated. The questionnaire and tests were directed towards reviling the respondents view and attitudes regarding the learning of hybrid pairs.

3.7.2 Data Analysis

– Data were collected by means of questionnaire, tests and semi-structured interview used as bases for drawing conclusions or making inferences. For the questionnaire, the students were asked to answer thirty (30) items according to five scales and to answer the diagnostic vocabulary tests.

– The researcher distributed the questionnaire and tests by herself to give the respondents a general idea about hybrid pairs.

– The questionnaire and tests were corrected by the researcher.

– To achieve the objectives of the study, a five point-scale questionnaire consisting of thirty items was developed by the researcher based on the

previous studies such as Nybakken (1959), Jespersen (1982) and Theodore and Berkowitz (1967) who aimed at investigating difficulties encountered in learning hybrid pairs. See Appendix 6 p. (131-133) and Appendix 7 p. (134)

- Diagnostic vocabulary tests were corrected by given (√) for correct answer and (×) for wrong one.
- The data were organized to produce meaningful information in relation to the research questions.
- The comprehensibility and adequacy of the questioners' responses to the questionnaire and tests are presented in tables.
- Finally, results were analyzed and discussed very clearly and simply. The researcher presented the recommendations for future studies.

3.7.3 Summary

To conclude this chapter, it may be imperative to say that methods and procedures were based on the objectives and questions of the present study. Furthermore, questions and suggested solutions that ideally suit the needs of learning hybrid pairs were offered, in addition to recommendations for future studies.

Chapter Four
Results and Discussion

4.1 Introduction

This chapter mainly presents the results of the survey as they are employed in the SPSS using the statistical analysis and T-test. The survey questionnaire was used as the main data-gathering instrument for this study (See Appendices (6, 7, 8, 9, 10, 11, 12 and 13). After gathering all the completed questionnaires and tests from the respondents, total responses for each item were obtained and tabulated to answer the questions of the study which are designed to explore the difficulties faced by Jordanian English and science major students in learning hybrid pairs.

The first section of the analysis emphasizes the responses to the questions measured by means and standard deviations to each of the proposed item, (See Tables 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11). The third part focuses on the diagnostic vocabulary test which attempts to find out the extent of correlation between responses of each participant and his/her specialization, (See Tables 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 and 33) assert if there are difficulties in learning hybrid pairs according to specializations and what causes these difficulties.

Questions of the study that need to be answered:

1- What makes hybrid pairs difficult to master by English and science major students?

2- What solutions are suggested to overcome difficulties that English and science major students encounter in learning hybrid pairs?

3- Is there a relationship between specialization and mastering hybrid pairs?

Means and standard deviation of the responses were calculated. Due to major variable, one way ANOVA (analysis of variance) was used to find any statistically significant differences in the means as shown in Tables (2, 3, 4 and 5). There are no statistically significant differences in problems due to major variable.

The total number of items in question 1 is twenty. (See Appendix 6 p.131-133).

The responses have been corrected and classified into five levels: strongly agree, agree, uncertain, disagree and strongly disagree.

4.2 Results related to the first question: What makes hybrid pairs difficult to master by English and science major students?

This dimension covers the following aspects: The language of hybrid pairs, difficulty of hybrid pairs, with whom these vocabularies are used, why it is difficult to master these pairs.

Look at Tables 2, 3, 4 and 5

Table (2): Difficulties students encounter in learning hybrid pairs

No.	Item	Science		Medicine		English		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Hybrid pairs are often long and complicated words	3.92	.66	3.28	.97	3.17	.96	3.37	.95
2	The difficulty of understanding the roots of hybrid pairs.	2.35	1.08	1.90	.72	2.28	1.01	2.14	.94
3	Hybrid pairs are irregular derivatives.	3.45	1.06	3.16	.99	3.52	.94	3.37	.99
4	Some students may meet words which are strange and unfamiliar to them because they are in specialized fields outside their own.	3.65	1.00	4.00	.90	4.09	.90	3.96	.93
5	Some hybrid pairs are not found in the English dictionary.	3.52	1.06	3.64	.98	3.56	.97	3.59	.99
6	Hybrid pairs are difficult to master.	3.20	.94	3.21	1.06	3.45	.91	3.31	.98
7	Some hybrid pairs are ambiguous.	3.45	.96	3.45	.86	3.69	.92	3.54	.91
8	Hybrid pairs cause problems for English and science-major students.	3.45	.64	2.85	1.14	3.46	1.12	3.21	1.09
9	Hybrid pairs are morphologically unrelated.	3.30	.94	3.15	.98	3.40	1.24	3.28	1.09
10	Hybrid pairs are difficult to recognize by foreign language learners.	3.50	.93	3.73	.93	3.20	1.21	3.47	1.07
11	Hybrid pairs can be viewed as having its own language.	3.45	.96	3.37	.91	3.20	1.02	3.32	.97
12	Hybrid pairs are a new language according to English and science major students.	3.25	1.35	3.50	.84	3.46	.98	3.44	1.02
13	A great deal of hybrid pairs is still formed in the traditional method from Latin and Greek roots and affixes which confuse students	3.50	1.18	3.60	.79	3.42	.85	3.51	.90
14	Students are unfamiliar with Neoclassical compounds which play an important role in forming hybrid pairs	2.40	.87	2.66	1.01	2.68	.84	2.62	.92
15	Hybrid pairs are only used by scientists.	2.93	.80	2.64	1.12	3.60	.98	3.08	1.09
16	Hybrid pairs have specialized and restricted uses.	3.40	.93	3.37	1.02	2.79	1.06	3.15	1.06
17	To explain phenomena, I avoid using hybrid pairs	3.72	.88	3.36	.97	3.23	1.02	3.38	.99
18	Textbooks ignore many hybrid pairs	3.25	1.28	2.95	.94	3.20	.97	3.11	1.03
19	Students have a limited number of opportunities to become familiar with hybrid pairs.	2.88	.88	2.00	.75	2.30	.97	2.30	.92
20	Students are unable to change some letters in Latin prefixes for correct pronunciation as hybrid pairs	3.03	1.27	3.65	.81	3.43	.94	3.43	.99
Total	Problems (all items)	3.28	.28	3.17	.25	3.26	.32	3.23	.29

Table (3): Difficulties facing to science major students

specialization	No. of item	SA strongly agree	A agree	Total 1/2	U Uncertain	D Disagree	SD Strongly disagree	Total 4+5	Mean	SD
		%	%	%	%	%	%	%		
Science	1	12.5	72.5	85.0	10.0	5.0		5.0	3.92	.656
	2		17.5	17.5	27.5	27.5	27.5	55.0	2.35	1.075
	3	10.0	47.5	57.5	30.0	2.5	10.0	12.5	3.45	1.061
	4	25.0	27.5	52.5	35.0	12.5		12.5	3.65	1.001
	5	17.5	40.0	57.5	22.5	17.5	2.5	20.0	3.52	1.062
	6	5.0	35.0	40.0	40.0	15.0	5.0	20.0	3.20	.939
	7	10.0	45.0	55.0	27.5	15.0	2.5	17.5	3.45	.959
	8		50.0	50.0	47.5		2.5	2.5	3.45	.639
	9	5.0	45.0	50.0	27.5	20.0	2.5	22.5	3.30	.939
	10	12.5	40.0	52.5	35.0	10.0	2.5	12.5	3.50	.934
	11	7.5	47.5	55.0	35.0	2.5	7.5	10.0	3.45	.959
	12	17.5	37.5	55.0	12.5	17.5	15.0	32.5	3.25	1.354
	13	27.5	17.5	45.0	37.5	12.5	5.0	17.5	3.50	1.177
	14		12.5	12.5	27.5	47.5	12.5	60.0	2.40	.871
	15		22.5	22.5	52.5	20.0	5.0	25.0	2.93	.797
	16	10.0	40.0	50.0	30.0	20.0		20.0	3.40	.928
	17	15.0	55.0	70.0	17.5	12.5		12.5	3.72	.877
	18	20.0	27.5	47.5	17.5	27.5	7.5	35.0	3.25	1.276
	19	5.0	15.0	20.0	45.0	32.5	2.5	35.0	2.88	.883
	20	10.0	30.0	40.0	32.5	7.5	20.0	27.5	3.03	1.271
	Total								3.28	.278

Table (4): Difficulties facing to medicine major students

specialization	No. of item	SA strongly agree	A agree	Total 1/2	U Uncertain	D Disagree	SD Strongly disagree	Total 4+5	Mean	SD
		%	%	%	%	%	%	%		
Medicine	1	5.0	45.0	50.0	26.3	20.0	3.8	23.8	3.28	.968
	2		2.5	2.5	13.8	55.0	28.8	83.8	1.90	.722
	3	11.3	22.5	33.8	38.8	26.3	1.3	27.5	3.16	.987
	4	27.5	53.8	81.3	13.8	1.3	3.8	5.0	4.00	.900
	5	18.8	43.8	62.5	20.0	17.5		17.5	3.64	.984
	6	15.0	21.3	36.3	36.3	25.0	2.5	27.5	3.21	1.064
	7	6.3	48.8	55.0	30.0	13.8	1.3	15.0	3.45	.855
	8	10.0	23.8	33.8	11.3	51.3	3.8	55.0	2.85	1.137
	9	6.3	36.3	42.5	25.0	31.3	1.3	32.5	3.15	.982
	10	20.0	45.0	65.0	22.5	12.5		12.5	3.73	.927
	11	7.5	43.8	51.3	27.5	21.3		21.3	3.37	.905
	12	12.5	35.0	47.5	42.5	10.0		10.0	3.50	.842
	13	6.3	58.8	65.0	25.0	8.8	1.3	10.0	3.60	.789
	14	6.3	8.8	15.0	41.3	32.5	11.3	43.8	2.66	1.006
	15	10.0	8.8	18.8	27.5	42.5	11.3	53.8	2.64	1.117
	16	7.5	48.8	56.3	23.8	13.8	6.3	20.0	3.37	1.023
	17	11.3	33.8	45.0	38.8	12.5	3.8	16.3	3.36	.971
	18	2.5	27.5	30.0	38.8	25.0	6.3	31.3	2.95	.940
	19		2.5	2.5	20.0	52.5	25.0	77.5	2.00	.746
	20	15.0	41.3	56.3	37.5	6.3		6.3	3.65	.813
	Total								3.17	.245

Table (5): Difficulties facing to English major students

Specialization	No. of item	SA strongly agree	A agree	Total 1/2	U Uncertain	D Disagree	SD Strongly disagree	Total 4+5	Mean	SD
		%	%	%	%	%	%	%		
English	1	6.3	33.8	40.0	35.0	21.3	3.8	25.0	3.17	.965
	2	3.8	7.5	11.3	22.5	45.0	21.3	66.3	2.28	1.006
	3	13.8	41.3	55.0	30.0	13.8	1.3	15.0	3.52	.941
	4	38.8	37.5	76.3	17.5	6.3		6.3	4.09	.903
	5	13.8	45.0	58.8	28.8	8.8	3.8	12.5	3.56	.966
	6	10.0	41.3	51.3	35.0	11.3	2.5	13.8	3.45	.913
	7	15.0	53.8	68.8	17.5	12.5	1.3	13.8	3.69	.922
	8	20.0	30.0	50.0	32.5	11.3	6.3	17.5	3.46	1.124
	9	22.5	27.5	50.0	26.3	15.0	8.8	23.8	3.40	1.239
	10	13.8	31.3	45.0	27.5	16.3	11.3	27.5	3.20	1.205
	11	10.0	28.8	38.8	37.5	18.8	5.0	23.8	3.20	1.024
	12	11.3	45.0	56.3	25.0	16.3	2.5	18.8	3.46	.980
	13	11.3	31.3	42.5	47.5	8.8	1.3	10.0	3.42	.854
	14	2.5	6.3	8.8	57.5	23.8	10.0	33.8	2.68	.839
	15	15.0	47.5	62.5	22.5	12.5	2.5	15.0	3.60	.976
	16	7.5	15.0	22.5	36.3	31.3	10.0	41.3	2.79	1.064
	17	10.0	31.3	41.3	33.8	21.3	3.8	25.0	3.23	1.018
	18	5.0	38.8	43.8	32.5	18.8	5.0	23.8	3.20	.973
	19		12.5	12.5	28.8	35.0	23.8	58.8	2.30	.973
	20	11.3	36.3	47.5	40.0	8.8	3.8	12.5	3.43	.938
	Total								3.26	.319

Opening the discussion with a look at item (1), (according to science major students) with a mean score of 3.92 and standard deviation, (66.0%) reveals that the majority of the respondents (85.0%) agreed to the focal point of the item and strongly believe that hybrid pairs are difficult words. The percentage of responses (50.0%) to item (1) with a mean score of 3.28 and standard deviation 97.5 declares that M.M.S believes that hybrid pairs are difficult words. In regard to item (1) with a mean score of 3.17 and a standard deviation, 97, 50 (40.0%) of the English responses agreed that hybrid pairs are complicated words, whereas (25.5%) of them disagreed.

Item (2) with a mean score of 2.35 and a standard deviation 1.08 according to SMS and with a mean score of 1.90 and a standard deviation 72 according to MMS with a mean score of 2.28 and a standard deviation 1.01 according to EMS. It is noticed that the participants disagreed that roots of hybrid pairs are difficult to understand since 55.0% of SMS disagreed, 83.8% of MMS disagreed and 66.3% of EMS disagreed. This high percentage of disagreement shows that the respondents are aware of the roots of hybrid pairs whereas those who disagreed tend to regard hybrid pairs as irregular derivatives. Concerning item (3) which states the irregularity since the findings of this item indicate that the respondents show their agreements, 57.5% of SMS agreed 55.0% of EMS agreed only 3.8% of MMS agreed. Regarding item (4) concerning the use of hybrid pairs according to specialized fields outside students' own the responses to this item show that science participants (52.5%), medicine participants (81.3%), English participants (76.3%) whereas they gave a positive stand toward the role of specialized field in mastering hybrid pairs.

In item (5), it seems that the students suffered a lot because many of these words are not found in most dictionaries. It is clear that 57.54 % of science major students agreed, 62.5% of medicine major students agreed and 58.8% of English major agreed. This finding can be reasonably justified as another reason behind difficulty of learning hybrid pairs.

Gradually, students reached to item (6) to say that the previous 1,3,4,5 items indicated that hybrid pairs are difficult to master and this is strongly supported

by the responses to item (6) whereas 40.0 % of SMS agreed, 36.3 % of MMS agreed and 51.3% of EMS agreed.

The researcher turned attention to item (7) with a mean score of 3.45 and a standard deviation .96 for science, with a mean score of 3.45 and standard deviation 86 for medicine and with mean 3.46 and standard deviation .92 for English major students whereas 55.0% of SMS agreed, 55.0% of MMS agreed and 68.8% of EMS agreed. In other words, this analysis enhances that students have ability to determine the difficulties in learning hybrid pairs and this agreement is explained by the deliberate and not accidental efforts made by students to illustrate the ambiguity of hybrid pairs. It has been mentioned that specialized fields have important role in learning hybrid pairs since 50.0% of SMS and 5.0% of EMS agreed, while 33.8% of MMS agreed. In the case of learning hybrid pairs, this causes difficulties not only for science and English major students but also for medicine major students. This result proves that hybrid pairs are used by science, English and medicine major students in general.

In response to item (9) with a mean score of 3.30 for SMS, 3.15 for MMS and 3.40 for EMS and standard deviation .94 for SMS, .98 for MMS, 1.24 for EMS. The researcher found that 50.0% of Science major students agreed, 42.5% of medicine major agreed 50.0% of English major agreed, in other words, such percentages of agreement reflect the attitude of respondents towards hybrid

pairs as unrelated words, since there is no morphological relationship between the word and its derivative.

The agreement, by science, medicine and English major students once again, is probably interrelated as an appeal to view hybrid pairs as difficult, restricted uses and having its own language which increases the need for students' especially foreign language learners to master this kind of words. This agreement is elucidated in response to item (10) with a mean score of 3.47 and a standard deviation 1.07 according to three majors, Item (11) with a mean score of 3.32 and a standard deviation .97 according to three majors, item (12) with a mean score of 3.44 and a standard deviation 1.02 according to three majors, and 16 items with a mean score of 3.15 and a standard deviation 1.66 for three majors.

According to science major students 45.0% agreed whereas 17.5% disagreed, medicine major students 56.0% agreed whereas 10.0% disagreed and English major students 24.5% agreed whereas 10.0% disagreed. This agreement suggests that students should learn to recognize word parts to avoid confusion. According to English major students, learning hybrid pairs will be less confusing for science and medicine major students because they need them most. Responses to item (5) with a mean score of 3.8 and a standard deviation 1.09, the responses on this item clearly show that (25.0%) (SMS) disagreed whereas 22.5% agreed, (35.8%) (MMS) agreed whereas (80.8%) disagreed but (26.5%) of English major students agreed whereas (50.0%) disagreed.

Further, as the hybrid pairs are difficult to master by all majors, so in item (7) it was not surprising that most of them avoid using hybrid pairs in conversation or writing. The responses showed that (70.0%) of science major students agreed, (45.0%) of medicine major students agreed whereas 60.3% disagreed and 41% of English major students agreed whereas 25.0% disagreed.

Furthermore, it is difficult to ignore the role of textbooks in overcoming this problem. It is highly noticed in item (8) with a mean score of 3.11 and a standard deviation 1.03 that participants confirmed that most textbooks ignore many hybrid pairs. This argument is an agreement in responses to item (19) and (14). It can be noticed in items (19) and (14) that the respondents did not have a clear strategy in deciding how to use neoclassical compounds and the relationship between hybrid pairs and this phrase. They also did not know how to create or get the opportunities that help them to master hybrid pairs. In closing this section, item (20) with a mean score of 3.34 and a standard deviation 99 shows that not only dictionaries and textbooks cause problem for students but also they cannot determine the Latin and Greek prefixes and suffixes. The high percentage of agreement is explained by Nybakken (1959): In English these Latin suffixes usually end in –"o, u and s"; for example: "ferrous"

Latin suffix	***Meaning***	***Noun***	***English derivation***
-eus	made of	fee rum(iron)	ferrous

In other words, in the etymological approach of building vocabulary you will be able to determine the meaning of thousands of English words that you have never seen before which are used in many fields of knowledge.

To answer the first question of the study, means and standard deviation of the responses were calculated due to the major variable, one way ANOVA was used. Table 6 shows that students face many problems in learning hybrid pairs and there are no statistically significant differences in difficulties due to the major variable.

Table(6): Means, Standard deviation, one way ANOVA result for the difficulties that science, English and medicine major students encounter in learning hybrid pairs

Group	*N*	*Mean*	*S.D*	*F*	*Sig*
Science	40	3.28	.28	2.542	.081
Medicine	80	3.17	.25	2.542	.081
English	80	3.26	32	2.542	.081

Those findings can be explained by the consciousness and awareness of the participants regardless of their specialization. Furthermore, these findings indicate that students encounter many problems in learning hybrid pairs.

4.3 Results related to the second question: What are suggested solutions to overcome difficulties that English and science major students encounter in learning hybrid pairs?

This section sheds light on the suggested solutions to overcome difficulties that English, medicine and science major students encounter in learning HP. Tables 7, 8, 9, 10 show the results.

Table (7)

Suggested solutions according to science, English and medicine major students

No.	Item	Science		Medicine		English		Total	
		Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
1	Knowledge of Greek and Latin prefixes, suffixes, and roots can enhance students' understanding of scientific terms.	4.22	1.31	4.07	.74	3.96	.95	4.06	.96
2	Using hybrid pairs daily with students to make the words real instead of using a list from the textbook.	3.80	.88	3.97	.83	3.81	.86	3.88	.85
3	Using hybrid pairs associated with a unit of study.	3.48	.78	3.70	.75	3.71	.81	3.66	.79
4	Analyzing hybrid pairs' structure helps students to determine the meaning.	3.22	1.19	4.14	.82	3.84	.89	3.84	.99
5	The most common way of creating hybrid pairs is to construct them by using Greek and Latin elements.	3.23	.83	3.42	.71	3.41	.81	3.38	.77
6	Talking, reading, writing about science will enhance using hybrid pairs	3.42	.55	4.09	.64	3.73	.90	3.81	.78
7	If science is taught effectively, the result will be to reinforce using and understanding hybrid pairs	4.07	.89	3.75	1.15	4.09	.81	3.95	.99
8	If you know the meanings of Greek and Latin roots of words, it makes them easier to remember.	3.90	1.01	4.23	.81	3.81	.98	4.00	.94
9	Reading more interesting scientific books help you to learn hybrid pairs	3.78	.83	3.75	.92	3.88	.88	3.80	.88
10	Teaching etymology of word in Jordanian universities.	4.55	.50	4.44	.57	4.40	.49	4.44	.53
Total	Solutions (all items)	3.77	.55	3.96	.38	3.86	.38	3.88	.43

Table (8): Suggested solutions according to science major students

specialization	No. of item	SA strongly agree	A agree	Total 1/2	U Uncertain	D Disagree	SD Strongly disagree	Total 4+5	Mean	SD
		%	%	%	%	%	%	%		
Science	1	65.0	17.5	82.5		10.0	7.5	17.5	4.22	1.310
	2	22.5	42.5	65.0	27.5	7.5		7.5	3.80	.883
	3	7.5	42.5	50.0	40.0	10.0		10.0	3.48	.784
	4	15.0	22.5	37.5	47.5		15.0	15.0	3.22	1.187
	5	10.0	17.5	27.5	57.5	15.0		15.0	3.23	.832
	6		45.0	45.0	52.5	2.5		2.5	3.42	.549
	7	32.5	52.5	85.0	5.0	10.0		10.0	4.07	.888
	8	32.5	37.5	70.0	17.5	12.5		12.5	3.90	1.008
	9	17.5	50.0	67.5	25.0	7.5		7.5	3.78	.832
	10	55.0	45.0	100.0					4.55	.504
	Total								3.77	.552

Table (9): Suggested solutions according to medicine major students

specialization	No. of item	SA strongly agree	A agree	Total 1/2	U Uncertain	D Disagree	SD Strongly disagree	Total 4+5	Mean	SD
		%	%	%	%	%	%	%		
Medicine	1	31.3	45.0	76.3	23.8				4.07	.742
	2	22.5	60.0	82.5	12.5	2.5	2.5	5.0	3.97	.826
	3	11.3	53.8	65.0	28.8	6.3		6.3	3.70	.753
	4	38.8	38.8	77.5	20.0	2.5		2.5	4.14	.823
	5	3.8	43.8	47.5	43.8	8.8		8.8	3.42	.708
	6	25.0	58.8	83.8	16.3				4.09	.640
	7	31.3	32.5	63.8	21.3	10.0	5.0	15.0	3.75	1.153
	8	42.5	41.3	83.8	12.5	3.8		3.8	4.23	.811
	9	26.3	28.8	55.0	38.8	6.3		6.3	3.75	.921
	10	47.5	48.8	96.3	3.8				4.44	.570
	Total								3.96	.382

Table (10): Suggested solutions according to English major students

Specialization	No. of item	SA strongly agree	A agree	Total 1/2	U Uncertain	D Disagree	SD Strongly disagree	Total 4+5	Mean	SD
		%	%	%	%	%	%	%		
English	1	31.3	43.8	75.0	16.3	7.5	1.3	8.8	3.96	.947
	2	23.8	37.5	61.3	36.3	1.3	1.3	2.5	3.81	.858
	3	12.5	55.0	67.5	25.0	6.3	1.3	7.5	3.71	.814
	4	22.5	46.3	68.8	26.3	2.5	2.5	5.0	3.84	.892
	5	7.5	36.3	43.8	48.8	5.0	2.5	7.5	3.41	.807
	6	18.8	43.8	62.5	31.3	3.8	2.5	6.3	3.73	.900
	7	33.8	45.0	78.8	17.5	3.8		3.8	4.09	.814
	8	23.8	47.5	71.3	17.5	8.8	2.5	11.3	3.81	.982
	9	21.3	55.0	76.3	15.0	7.5	1.3	8.8	3.88	.877
	10	40.0	60.0	100.0					4.40	.493
	Total								3.86	.383

In response to item (1) with a mean score of .22 and a standard deviation 1.310, the researcher found that 82.5% of SMS agreed, in the same time, 76.3 of MMS agreed and 75.0 of EMS agreed. The findings of this item indicate that the respondents showed a quite positive attitude toward this solution. This agreement can be explained in light of their belief in the importance of Latin and Greek affixes and roots in forming hybrid pairs since most of technical words used in medicine and dentistry have their origins in the Greek and Latin languages.

Using hybrid pairs daily with students makes these words familiar and easy to use. This is further approved in responses to item (2) viewing using hybrid pairs daily as another solution since 65.0% of SMS agreed, 82.5% of MMS agreed and 61.3% of EMS agreed. This high percentage of agreement is just a mirror reflecting the participants' need to use hybrid pairs daily.

It is noticed that the reaction of the participants toward finding a suitable solution is increased. According to MMS 65.0% strongly observe the need for using hybrid pairs associated with a unit of study which creates a sense of superiority in its speakers in general, and in anyone who has a proficiency in English and science in particular. This point is further emphasized in response

to item (3) with a mean score of 3.88 and a standard deviation 85 additionally, 50.0% of SMS agreed, 65.0% of MMS agreed whereas 6.3% disagreed and 67.5% of EMS agreed, whereas 7.5% disagreed with this stream of thought.

After illustrating the importance of associated hybrid pairs with a unit of a study, 77.5% of medicine major students agreed that the next stage will be the analysis of hybrid pairs' structure, to determine the meaning. This point is further supported in responses to item (4), since (68.8%) of English major students agreed, (37.5%) of science major students agreed whereas (15.0%) disagreed. According to the respondents, may redress Latin and Greek elements as agate to master hybrid pair.

In responses to both items (5) and (8) with a mean score of 3.38 and a standard deviation 77 to the former and with a mean score of 4.00 and a standard deviation .94 to the latter, 27.5% of SMS agreed whereas 15.0% disagreed, 47.5% of MMS agreed whereas 8.8% disagreed and 43.8% of EMS agreed whereas 7.5 disagreed to the former and 70.0% of SMS agreed, 83.8% of MMS agreed and 71.3% of EMS agreed to the latter. The high percentage of responses to item (5) and (8) reveals an understanding of role of Latin and Greek in forming hybrid pairs, especially that most of hybrid pairs are scientific terms.

This phenomenon may be properly explained in Nybakken (1959) when he said that major attention should be given to the lists of Latin and Greek words. Only by learning the meanings of more and more word-elements can the students acquire the ability to compute the meanings of technical words.

Another suggested solution is exposed by the research. Thus, the respondents are highly motivated to consider most of hybrid pairs as a source of scientific terms. So they are rather eager to encourage and assert that speaking, reading and writing about science will enhance using hybrid pairs. Turning to the respondents who agreed, the researcher may explain this agreement in light of their beliefs regardless of their specializations. Item (6) shows that 83.8% of

MMS agreed, 62.5% of EMS agreed and 45.0% of SMS agreed whereas 2.5% disagreed. Thus, reading academic and science books reinforces using hybrid pairs. High percentages of agreement have been shown in responses to items (7) and (9). It was found that 76.5% of SMS agreed, 60.0% of MMS agreed and 77.8% of EMS agreed.

Regarding item (10), teaching etymology of words in Jordanian universities, the responses to this item showed that the majority of the participants gave a positive stand towards the importance of teaching etymology of word as a university subject in the earlier stages.

This is explained in light of achieving proficiency in using hybrid pairs as they are introduced to them in the early stages, i.e. the earlier they are introduced to using hybrid pairs, the better the level of proficiency they are likely to achieve. The majority of the responses may be explained in light of the fact in that teaching etymology of words (i.e.) teaching the history of word in Jordanian universities is the main suggested solution to master hybrid pairs.

Item (10) with a mean score of 4.44 and a standard deviation 53.0 is concerned with the outcome of teaching etymology of word in Jordanian universities.

The responses show that (100.0%) of science major students agreed (96.3%) of medicine major students agreed and (100.0%) of English major students agreed. The high percentage of agreement reflects the respondents' awareness and consciousness toward the role of teaching the etymology of the word in forming hybrid pairs. (See Tables 7, 8, 9 and 10).

Table (11): Means, standard deviation, one way ANOVA results for suggested solutions to overcome difficulties that students encounter in learning hybrid pairs

Group	*N.*	*Mean*	*S.D*	*F*	*Sig*
Science	40	3.77	.55	2.788	.064
Medical	80	3.96	.38		
English	80	3.86	.38		

The table shows that there are no statistically significant differences in solutions due to major variable.

4.4 Results related to the third question: Is there a relationship between specialization and mastering hybrid pairs?

Diagnostic vocabulary tests are divided into six sections which are A, B, C, D, E and F. The responses have been corrected and classified into two categories: correct answers and wrong answers.

Tables (12 and 13) below show the results related to section (A).

Table (12)

Diagnostic vocabulary test: section (A) match the nouns with their irregular derivatives

No.	Science				Medicine				English			
	Correct Answer		Wrong Answer		Correct Answer		Wrong Answer		Correct Answer		Wrong Answer	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
1	20	50.0	20	50.0	64	80.0	16	20.0	55	68.8	25	31.3
2	19	47.5	21	52.5	50	62.5	30	37.5	15	18.8	65	81.3
3	8	20.0	32	80.0	26	32.5	54	67.5	33	41.3	47	58.8
4	11	27.5	29	72.5	41	51.3	39	48.8	45	56.3	35	43.8
5	13	32.5	27	67.5	40	50.0	40	50.0	36	45.0	44	55.0
6	16	40.0	24	60.0	59	73.8	21	26.3	5	6.3	75	93.8
7	9	22.5	31	77.5	46	57.5	34	42.5	34	42.5	46	57.5
8	9	22.5	31	77.5	10	12.5	70	87.5	14	17.5	66	82.5
9	17	42.5	23	57.5	40	50.0	40	50.0	35	43.8	45	56.3
10	21	52.5	19	47.5	63	78.8	17	21.3	35	43.8	45	56.3
11	10	25.0	30	75.0	19	23.8	61	76.3	14	17.5	66	82.5
12	15	37.5	25	62.5	46	57.5	34	42.5	55	68.8	25	31.3
13	12	30.0	28	70.0	41	51.3	39	48.8	44	55.0	36	45.0
14	8	20.0	32	80.0	18	22.5	62	77.5	27	33.8	53	66.3
15	12	30.0	28	70.0	61	76.3	19	23.8	32	40.0	48	60.0
16	8	20.0	32	80.0	34	42.5	46	57.5	31	38.8	49	61.3
17	15	37.5	25	62.5	54	67.5	26	32.5	56	70.0	24	30.0
18	14	35.0	26	65.0	52	65.0	28	35.0	49	61.3	31	38.8
19	9	22.5	31	77.5	37	46.3	43	53.8	19	23.8	61	76.3
20	18	45.0	22	55.0	57	71.3	23	28.8	59	73.8	21	26.3
21	12	30.0	28	70.0	38	47.5	42	52.5	30	37.5	50	62.5
22	19	47.5	21	52.5	54	67.5	26	32.5	20	25.0	60	75.0
23	14	35.0	26	65.0	42	52.5	38	47.5	46	57.5	34	42.5
24	17	42.5	23	57.5	55	68.8	25	31.3	18	22.5	62	77.5
25	8	20.0	32	80.0	8	10.0	72	90.0	1	1.3	79	98.8
26	12	30.0	28	70.0	22	27.5	58	72.5	16	20.0	64	80.0
27	9	22.5	31	77.5	47	58.8	33	41.3	14	17.5	66	82.5
28	10	25.0	30	75.0	19	23.8	61	76.3	1	1.3	79	98.8
29	13	32.5	27	67.5	16	20.0	64	80.0	36	45.0	44	55.0
30	16	40.0	24	60.0	33	41.3	47	58.8	2	2.5	78	97.5
Total	394	32.8	806	67.2	1192	49.7	1208	50.3	877	36.5	1523	63.5

The respondents according SMS are forty and the numbers of items are thirty (30) so 30 ×40 =1200 responses

Table (13): Frequency and percentage of correct answers for every item according to science, medicine and English major students

No.	Items and correct answer	Science		Medicine		English		Total	
		Count	%	Count	%	Count	%	Count	%
1	animal- zoological	20	50.0	64	80.0	55	68.8	139	69.5
2	arm -brachial	19	47.5	50	62.5	15	18.8	84	42.0
3	book-bibliographic	8	20.0	26	32.5	33	41.3	67	33.5
4	city- urban	11	27.5	41	51.3	45	56.3	97	48.5
5	car- automotive	13	32.5	40	50.0	36	45.0	89	44.5
6	eye- ocular	16	40.0	59	73.8	5	6.3	80	40.0
7	father- paternal	9	22.5	46	57.5	34	42.5	89	44.5
8	ghost- spectral	9	22.5	10	12.5	14	17.5	33	16.5
9	hand- manual	17	42.5	40	50.0	35	43.8	92	46.0
10	heart- cardiac	21	52.5	63	78.8	35	43.8	119	59.5
11	island- insular	10	25.0	19	23.8	14	17.5	43	21.5
12	king- royal	15	37.5	46	57.5	55	68.8	116	58.0
13	law- legal	12	30.0	41	51.3	44	55.0	97	48.5
14	moon- lunar	8	20.0	18	22.5	27	33.8	53	26.5
15	mouth- oral	12	30.0	61	76.3	32	40.0	105	52.5
16	name- nominal	8	20.0	34	42.5	31	38.8	73	36.5
17	nose- nasal	15	37.5	54	67.5	56	70.0	125	62.5
18	sun- solar	14	35.0	52	65.0	49	61.3	115	57.5
19	speech- verbal	9	22.5	37	46.3	19	23.8	65	32.5
20	tooth- dental	18	45.0	57	71.3	59	73.8	134	67.0
21	tongue- lingual	12	30.0	38	47.5	30	37.5	80	40.0
22	water- aqueous	19	47.5	54	67.5	20	25.0	93	46.5
23	year- annual	14	35.0	42	52.5	46	57.5	102	51.0
24	iron - ferrous	17	42.5	55	68.8	18	22.5	90	45.0
25	rain - pluvial	8	20.0	8	10.0	1	1.3	17	8.5
26	baby - infantile	12	30.0	22	27.5	16	20.0	50	25.0
27	birth - natal	9	22.5	47	58.8	14	17.5	70	35.0
28	bridge- pontine	10	25.0	19	23.8	1	1.3	30	15.0
29	church- ecclesiastical	13	32.5	16	20.0	36	45.0	65	32.5
30	eyelid - palpebral	16	40.0	33	41.3	2	2.5	51	25.5

In this section, the data analysis of the parallel corpus which consists of 30 items to discover if students can recognize the nouns and their adjectives as hybrid pairs and the conditioning factors behind their responses. Each item is dedicated to investigate the hybrid pairs answered by science, medicine and English major students.

4.5 Diagnostic Vocabulary Test: Section (A) match the nouns with their irregular derivatives

Light is shed on the main parts of each item. As shown in (Table 12 and 13) this section is answered by forty of SMS which consists of thirty items. Only 394 responses out of 1200 (32.8%) provided correct answers and 806 responses out of 1200 (67.2%) provided wrong answers. For this section the percentage of a wrong answer was the highest, this challenge can be attributed to the respondents' lack of competence in mastering hybrid pairs. Again 1192 responses out of 2400 (49.7%) provided a correct answer whereas 1208 responses out of 2400 (50.3%) provided a wrong answer. It is noted that there was convergence in the percentages of the correct answers and wrong answers because these items are scientific vocabulary. In the same conditions the English major students answered this question since 877 responses out of 2400 (36.5%) provided a correct answer whereas 1523 responses out of 2400 (63.5%) provided a wrong answer. English major students faced a number of difficulties in answering this section. Respondents showed lack of knowledge in mastering hybrid pairs especially unfamiliar and scientific ones. However, there are some words which are difficult to master regardless of specialization. For example, look at item 25 which aims to give the adjective of 'rain', a few of SMS, MMS and EMS provided a correct answer because the adjective 'pluvial' is unfamiliar to them. All in all, data demonstrate that MMS were the highest. In other words the previous results showed that there is a relationship between specialization and mastering hybrid pairs. (See Table 14, Section A).

Table (14): Means, standard deviation, one way ANOVA results for the effect of major on students' responses

specialization	*No.*	*Mean*	*S.D*	*F*	*Sig.*
Science	40	9.85	6.23	11.802	.000
Medicine	80	14.90	7.05		
English	80	10.96	5.36		

Although the students were unable to match nouns with their correct adjectives, it was clear that some respondents could not differentiate between most of adjectives, since they are morphologically unrelated. So, the results were matching the nouns with wrong adjectives.

Sample of answers for section A. Match the nouns with their irregular derivatives. Look at (Table 15). Sample of answers

Table (15): Sample of answers

Appendix 6 Part III: 30 Words Match the nouns with their irregular derivatives				
answer	**No.**	**Noun**	**Letter**	**Derivation adjective**
√ **u**	**1**	Animal	**a**	Annual
z	**2**	Arm	**b**	Ferrous
e	**3**	Book	**c**	Lingual
√ **q**	**4**	City	**d**	Palpebral
f	**5**	Car	**e**	Verbal
s	**6**	Eye	**f**	Solar
j	**7**	Father	**g**	Royal
i	**8**	Ghost	**h**	Ecclesiastical
√ **n**	**9**	Hand	**i**	Lunar
	10	Heart	**j**	Nominal
re	**11**	Island	**k**	Spectral
√ **g**	**12**	King	**l**	Infantile
√ **la**	**13**	Law	**m**	Insular
	14	Moon	**n**	Manual
√ **so**	**15**	Mouth	**o**	Cardiac
	16	Name	**p**	Automotive
√ **w**	**17**	Nose	**q**	Urban
r	**18**	Sun	**r**	Pluvial
	19	Speech	**s**	Natal
√ **jo**	**20**	Tooth	**t**	Brachial
x	**21**	Tongue	**u**	Zoological
	22	Water	**v**	Pontine
√ **a**	**23**	Year	**w**	Nasal
y	**24**	Iron	**x**	Aqueous
	25	Rain	**y**	Ocular
√ **l**	**26**	Baby	**z**	Paternal
c	**27**	Birth	**re**	Bibliographic
d	**28**	Bridge	**so**	Oral
o	**29**	Church	**la**	Legal
b	**30**	Eyelid	**jo**	Dental

In the light of the previous findings, it seems that some words are strange for participants since they cannot give the correct answer for every word. On the other hand, students face some difficulties because they can not differentiate between nouns and their adjectives. For example, these adjectives, such as

brachial, spectral, insular, ferrous, pluvial, pontine, palpebral are unfamiliar for them since most of them are related to Greek and Latin elements.

4.6 Diagnostic Vocabulary Test: Section (B)

See if you can guess the animal referred to by each of the following adjectives. Please match the adjective with its animal name (See Table 16)

Table(16): Diagnostic vocabulary test: Section (B)

No.	Science				Medicine				English			
	Correct Answer		Wrong Answer		Correct Answer		Wrong Answer		Correct Answer		Wrong Answer	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
1	12	30.0	28	70.0	4	5.0	76	95.0	8	10.0	72	90.0
2	9	22.5	31	77.5	5	6.3	75	93.8	6	7.5	74	92.5
3	3	7.5	37	92.5	5	6.3	75	93.8	7	8.8	73	91.3
4	8	20.0	32	80.0	4	5.0	76	95.0	7	8.8	73	91.3
5	8	20.0	32	80.0	2	2.5	78	97.5	4	5.0	76	95.0
6	8	20.0	32	80.0	5	6.3	75	93.8	1	1.3	79	98.8
7	10	25.0	30	75.0	6	7.5	74	92.5	6	7.5	74	92.5
8	10	25.0	30	75.0	3	3.8	77	96.3	3	3.8	77	96.3
9	8	20.0	32	80.0	2	2.5	78	97.5	1	1.3	79	98.8
10	9	22.5	31	77.5	7	8.8	73	91.3	6	7.5	74	92.5
11	12	30.0	28	70.0	7	8.8	73	91.3	9	11.3	71	88.8
12	13	32.5	27	67.5	7	8.8	73	91.3	15	18.8	65	81.3
13	11	27.5	29	72.5	7	8.8	73	91.3	7	8.8	73	91.3
14	10	25.0	30	75.0	1	1.3	79	98.8	8	10.0	72	90.0
15	11	27.5	29	72.5	5	6.3	75	93.8	4	5.0	76	95.0
16	11	27.5	29	72.5	8	10.0	72	90.0	10	12.5	70	87.5
17	10	25.0	30	75.0	12	15.0	68	85.0	5	6.3	75	93.8
18	10	25.0	30	75.0	24	30.0	56	70.0	11	13.8	69	86.3
19	12	30.0	28	70.0	8	10.0	72	90.0	6	7.5	74	92.5
20	14	35.0	26	65.0	16	20.0	64	80.0	13	16.3	67	83.8
21	13	32.5	27	67.5	37	46.3	43	53.8	52	65.0	28	35.0
22	9	22.5	31	77.5	6	7.5	74	92.5	11	13.8	69	86.3
23	17	42.5	23	57.5	24	30.0	56	70.0	34	42.5	46	57.5
24	11	27.5	29	72.5	10	12.5	70	87.5	14	17.5	66	82.5
d25	13	32.5	27	67.5	19	23.8	61	76.3	28	35.0	52	65.0
26	17	42.5	23	57.5	44	55.0	36	45.0	32	40.0	48	60.0
27	8	20.0	32	80.0	38	47.5	42	52.5	24	30.0	56	70.0
28	8	20.0	32	80.0	7	8.8	73	91.3	6	7.5	74	92.5
29	11	27.5	29	72.5	4	5.0	76	95.0	10	12.5	70	87.5
30	15	37.5	25	62.5	5	6.3	75	93.8	9	11.3	71	88.8
Total	321	26.8	879	73.3	332	13.8	2068	86.2	357	14.9	2043	85.1

Respondents failed to answer this section correctly. In fact, it was the most difficult section for all major students, since most of adjectives are related to animals names, so the researcher noticed that section B was answered perfectly by SMS especially biology major students.

Table (17): Frequency and percentage of the correct answers for every item according to science, medicine and English major students

No.	Items and correct answer	Science		Medicine		English		Total	
		Count	%	Count	%	Count	%	Count	%
1	lagomorphic- rabbit	12	30.0	4	5.0	8	10.0	24	12.0
2	piscine- fish	9	22.5	5	6.3	6	7.5	20	10.0
3	spian- bee	3	7.5	5	6.3	7	8.8	15	7.5
4	bovine- cow	8	20.0	4	5.0	7	8.8	19	9.5
5	leonine- lion	8	20.0	2	2.5	4	5.0	14	7.0
6	equine- horse	8	20.0	5	6.3	1	1.3	14	7.0
7	lupine- wolf	10	25.0	6	7.5	6	7.5	22	11.0
8	canine- dog	10	25.0	3	3.8	3	3.8	16	8.0
9	otarine- seal	8	20.0	2	2.5	1	1.3	11	5.5
10	feline- cat	9	22.5	7	8.8	6	7.5	22	11.0
11	ranine- frog	12	30.0	7	8.8	9	11.3	28	14.0
12	cervine- deer	13	32.5	7	8.8	15	18.8	35	17.5
13	srachnoid- dpider	11	27.5	7	8.8	7	8.8	25	12.5
14	porcine- pig	10	25.0	1	1.3	8	10.0	19	9.5
15	simian- monkey	11	27.5	5	6.3	4	5.0	20	10.0
16	strigine- owl	11	27.5	8	10.0	10	12.5	29	14.5
17	vulpine- fox	10	25.0	12	15.0	5	6.3	27	13.5
18	ovine- sheep	10	25.0	24	30.0	11	13.8	45	22.5
19	murine- mouse	12	30.0	8	10.0	6	7.5	26	13.0
20	serpentine- snake	14	35.0	16	20.0	13	16.3	43	21.5
21	caprine- goat	13	32.5	37	46.3	52	65.0	102	51.0
22	vituline- calf	9	22.5	6	7.5	11	13.8	26	13.0
23	ursine- bear	17	42.5	24	30.0	34	42.5	75	37.5
24	aviary- bird	11	27.5	10	12.5	14	17.5	35	17.5
25	pavonine- peacock	13	32.5	19	23.8	28	35.0	60	30.0
26	chiropteran- bat	17	42.5	44	55.0	32	40.0	93	46.5
27	asinine- donkey	8	20.0	38	47.5	24	30.0	70	35.0
28	corvine- crow	8	20.0	7	8.8	6	7.5	21	10.5
29	lepidopterous- butterfly	11	27.5	4	5.0	10	12.5	25	12.5
30	aquiline- eagle	15	37.5	5	6.3	9	11.3	29	14.5

Analysis of date of Tables (16 and 17) suggested that the highest percentage of wrong answers proves that students encounter a great problem in answering this

question. However, it is worth pointing that most of participants regardless of their specializations were unable to guess the correct answers.

Obviously, these findings assert that it was difficult for students to match the adjectives with their nouns since 321 of science responses out of 1200 (26.8%) provided a correct answer whereas 879 of responses (73.3%) provided a wrong answer on the other hand, 332 of medicine responses out of 2400 (13.8%) provided a correct answer whereas 2068 of responses (86.2%) provided a wrong answer. Similarly 357 of English responses out of 2400 (14.9%) provided a correct answer whereas 2043 of responses (85.1%) provided a wrong answer.

To sum up, it seems that all participants are unfamiliar with these words; further, analysis shows that hybrid pairs according to this section are long and complicated; they are also difficult to pronounce and to guess their meaning. The researcher asked respondents to match the adjectives with the animal nouns, since the researcher expected that it would be easy but were not well. For example, the noun of "lagomorphic" is "rabbit", "serpentine" is "snake", "lepidopterous" is butterfly, "arachnoid" is spider.

Table (18): Sample of answers

Appendix 7
Part IV: 30 Words
See if you can guess the animal referred to by each of the following adjectives. Please match the adjective with its animal name.

	No.	Adjective	No.	Animal name
	1	lagomorphic	**11**	eagle
	2	piscine	**17**	butterfly
	3	apian	**9**	crow
	4	bovine	**7**	donkey
	5	leonine	**14**	bat
	6	equine	**2**	peacock
	7	lupine	**18**	bird
	8	canine	**25**	bear
	9	otarine	**12**	calf
	10	feline	**8**	goat
	11	ranine	**30**	snake
√	**12**	cervine	**19**	mouse
	13	arachnoid	**22**	sheep
	14	porcine	**28**	fox
	15	simian	**6**	owl
	16	strigine	**27**	monkey
	17	vulpine	**20**	pig
	18	ovine	**26**	spider
	19	murine	**1**	deer
	20	serpentine	**15**	frog
√	**21**	caprine	**10**	cat
	22	vituline	**29**	seal
	23	ursine	**16**	dog
	24	aviary	**13**	wolf
	25	pavonine	**24**	horse
√	**26**	chiropteran	**5**	lion
√	**27**	asinine	**4**	cow
√	**28**	corvine	**3**	bee
	29	lepidopterous	**21**	fish
	30	aquiline	**23**	rabbit

It is noticed that only 5 items were correct and the others were wrong, the results can be related to the previous reasons.

4.7 Diagnostic Vocabulary Test: Section (C) Fill in the blanks

Major attention should be given to the lists of hybrid pairs which are listed before the sentences. Only by learning and mastering the meanings can students develop their capacity to fill these words in the blanks.

All in all, most respondents did not understand the meaning of words which led to wrong answers. Some of responses were correct; hence the researcher found that beyond such answering these items, is the specialization. In other words, the more terms are close to specialization the more students provided correct answers. Look at (Table 19 and 20).

Table (19): Diagnostic vocabulary test: section (C) Fill in the blanks

No. of Q.C	Science				Medicine				English			
	Correct Answer		Wrong Answer		Correct Answer		Wrong Answer		Correct Answer		Wrong Answer	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
1	16	40.0	24	60.0	37	46.3	43	53.8	27	33.8	53	66.3
2	18	45.0	22	55.0	17	21.3	63	78.8	29	36.3	51	63.8
3	7	17.5	33	82.5	3	3.8	77	96.3	14	17.5	66	82.5
4	7	17.5	33	82.5	12	15.0	68	85.0	20	25.0	60	75.0
5	5	12.5	35	87.5	4	5.0	76	95.0	6	7.5	74	92.5
6	10	25.0	30	75.0	28	35.0	52	65.0	15	18.8	65	81.3
7	12	30.0	28	70.0	14	17.5	66	82.5	44	55.0	36	45.0
8	14	35.0	26	65.0	53	66.3	27	33.8	11	13.8	69	86.3
9	17	42.5	23	57.5	19	23.8	61	76.3	15	18.8	65	81.3
10	14	35.0	26	65.0	45	56.3	35	43.8	12	15.0	68	85.0
11	5	12.5	35	87.5	17	21.3	63	78.8	2	2.5	78	97.5
12	15	37.5	25	62.5	10	12.5	70	87.5	25	31.3	55	68.8
13	5	12.5	35	87.5	2	2.5	78	97.5	13	16.3	67	83.8
14	4	10.0	36	90.0	11	13.8	69	86.3	1	1.3	79	98.8
15	2	5.0	38	95.0	5	6.3	75	93.8	3	3.8	77	96.3
16	0	0	40	100.0	3	3.8	77	96.3	1	1.3	79	98.8
17	5	12.5	35	87.5	5	6.3	75	93.8	5	6.3	75	93.8
18	12	30.0	28	70.0	21	26.3	59	73.8	19	23.8	61	76.3
19	11	27.5	29	72.5	30	37.5	50	62.5	1	1.3	79	98.8
20	8	20.0	32	80.0	3	3.8	77	96.3	23	28.8	57	71.3
21	6	15.0	34	85.0	38	47.5	42	52.5	3	3.8	77	96.3
22	7	17.5	33	82.5	22	27.5	58	72.5	7	8.8	73	91.3
23	2	5.0	38	95.0	30	37.5	50	62.5	1	1.3	79	98.8
24	3	7.5	37	92.5	12	15.0	68	85.0	14	17.5	66	82.5
25	3	7.5	37	92.5	5	6.3	75	93.8	18	22.5	62	77.5
26	7	17.5	33	82.5	3	3.8	77	96.3	13	16.3	67	83.8
27	9	22.5	31	77.5	40	50.0	40	50.0	0		80	100.0
28	6	15.0	34	85.0	18	22.5	62	77.5	21	26.3	59	73.8
29	11	27.5	29	72.5	3	3.8	77	96.3	3	3.8	77	96.3
30	21	52.5	19	47.5	13	16.3	67	83.8	26	32.5	54	67.5
Total	262	21.8	938	78.2	523	21.8	1877	78.2	392	16.3	2008	83.7

Table (20): Frequency and percentage of the correct answers for every item according to science, medicine and English major students

No.	Correct item	Science		Medicine		English		Total	
		Count	%	Count	%	Count	%	Count	%
1	aerial	16	40.0	37	46.3	27	33.8	80	40.0
2	aural	18	45.0	17	21.3	29	36.3	64	32.0
3	corporal	7	17.5	3	3.8	14	17.5	24	12.0
4	divine	7	17.5	12	15.0	20	25.0	39	19.5
5	filial	5	12.5	4	5.0	6	7.5	15	7.5
6	thermal	10	25.0	28	35.0	15	18.8	53	26.5
7	mental	12	30.0	14	17.5	44	55.0	70	35.0
8	vital	14	35.0	53	66.3	11	13.8	78	39.0
9	oleic	17	42.5	19	23.8	15	18.8	51	25.5
10	dermal	14	35.0	45	56.3	12	15.0	71	35.5
11	decimal	5	12.5	17	21.3	2	2.5	24	12.0
12	ferrous	15	37.5	10	12.5	25	31.3	50	25.0
13	pomaceous	5	12.5	2	2.5	13	16.3	20	10.0
14	cupric	4	10.0	11	13.8	1	1.3	16	8.0
15	diurnal	2	5.0	5	6.3	3	3.8	10	5.0
16	auric			3	3.8	1	1.3	4	2.0
17	matinal	5	12.5	5	6.3	5	6.3	15	7.5
18	maternal	12	30.0	21	26.3	19	23.8	52	26.0
19	cervical	11	27.5	30	37.5	1	1.3	42	21.0
20	tactile	8	20.0	3	3.8	23	28.8	34	17.0
21	olfactory	6	15.0	38	47.5	3	3.8	47	23.5
22	tertiary	7	17.5	22	27.5	7	8.8	36	18.0
23	vernal	2	5.0	30	37.5	1	1.3	33	16.5
24	sartorial	3	7.5	12	15.0	14	17.5	29	14.5
25	gustatory	3	7.5	5	6.3	18	22.5	26	13.0
26	fenestral	7	17.5	3	3.8	13	16.3	23	11.5
27	carpal	9	22.5	40	50.0			49	24.5
28	mutual	6	15.0	18	22.5	21	26.3	45	22.5
29	littoral	11	27.5	3	3.8	3	3.8	17	8.5
30	dextral	21	52.5	13	16.3	26	32.5	60	30.0

As shown in (Table 19 and 20) according to item 7, it seems that 44 of English responses (55.0%) provided a correct answer. Here is an example of a correct answer for this item: *He is a <u>mental</u> patient in this hospital since he has lost his money.*

It should be noted that most of English major students' correct answers are related to the understanding of the entire sentence. In other words, they

depended on the general meaning of the sentences. Again if you go back to item (8), you will find that the medicine major students were the best since 55 of responses (66.3%) provided a correct answer.

This is an example of a correct answer: *The lungs perform a vital function.*

The students cannot normally be expected to analyze and define all the derivatives under their structure which relate to Latin and Greek language, but they defined that through using them in their fields. In other words, these terms are familiar to them through their specializations.

A look at (Tables 19 and 20) item 30 shows that 21 of science responses (52.5%) provided a correct answer. They were better than English and medicine major students. This is an example of a correct answer: *English books are placed in the dextral direction.*

Most of respondents were able to choose the correct answer because this word actually relates to scientific terms, regardless; the term is derived from Latin or Greek language i.e they did not depend on the etymology of word. In general, this states that there is an attitudinal correlation between learning hybrid pairs and specialization. This means that the researcher expects that the responses to the items (7, 8 and 30) relating to the phenomenon that the study deals with vary from field to another passed on his/her specialization. But this phenomenon was not applied for the other items. In other words, the findings indicate that the respondents despite their specialization hold the same views and difficulties regarding learning hybrid pairs. A look at Table 19 the total shows that 262 of science responses out of 1200 (21.8%) provided a correct answer whereas 938 of responses (78.2%) provided a wrong answer. Also 523 of medicine responses out of 2400 (21.8%) provided a correct answer whereas 1877 of them (78.2%) provided a wrong answer.

Moreover, 392 of English responses out of 2400 (16.3%) provided a correct answer whereas 2008 of them (83.7%) provided a wrong answer.

In testing the validity of this hypothesis means and standard deviation of responses were calculated due to major variables, one way ANOVA was used to find any statistically significant differences in the means as shown in (Table 21).

Table (21): Means, standard deviation, one way ANOVA results for the effect of major on students' responses

Specialization	*No.*	*mean*	*S.D*	*F*	*Sig*
Science	40	6.55	2.23	11.520	.000
Medicine	80	6.54	3.52		
English	80	4.90	1.65		

Table (21) shows that there were significant differences in section c due to major variables.

4.8 Diagnostic Vocabulary Test: Section (D)

Put (√) or (×). Look at Tables (22& 23)

Table (22): Diagnostic vocabulary test: Section (D) ⟹ Put √ or ×

No. of Q. D	Science				Medicine				English			
	Correct Answer		Wrong Answer		Correct Answer		Wrong Answer		Correct Answer		Wrong Answer	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
1	26	65.0	14	35.0	78	97.5	2	2.5	3	3.8	77	96.3
2	5	12.5	35	87.5	8	10.0	72	90.0	40	50.0	40	50.0
3	15	37.5	25	62.5	54	67.5	26	32.5	35	43.8	45	56.3
4	6	15.0	34	85.0	17	21.3	63	78.8	7	8.8	73	91.3
5	3	7.5	37	92.5	13	16.3	67	83.8	19	23.8	61	76.3
6	6	15.0	34	85.0	8	10.0	72	90.0	5	6.3	75	93.8
7	25	62.5	15	37.5	48	60.0	32	40.0	72	90.0	8	10.0
8	22	55.0	18	45.0	59	73.8	21	26.3	71	88.8	9	11.3
9	17	42.5	23	57.5	34	42.5	46	57.5	6	7.5	74	92.5
10	0	0	40	100.0	8	10.0	72	90.0	7	8.8	73	91.3
11	6	15.0	34	85.0	8	10.0	72	90.0	6	7.5	74	92.5
12	13	32.5	27	67.5	4	5.0	76	95.0	7	8.8	73	91.3
13	8	20.0	32	80.0	10	12.5	70	87.5	6	7.5	74	92.5
14	20	50.0	20	50.0	65	81.3	15	18.8	12	15.0	68	85.0
15	15	37.5	25	62.5	25	31.3	55	68.8	22	27.5	58	72.5
16	18	45.0	22	55.0	72	90.0	8	10.0	60	75.0	20	25.0
17	10	25.0	30	75.0	9	11.3	71	88.8	36	45.0	44	55.0
18	1	2.5	39	97.5	13	16.3	67	83.8	5	6.3	75	93.8
19	22	55.0	18	45.0	65	81.3	15	18.8	73	91.3	7	8.8
20	1	2.5	39	97.5	2	2.5	78	97.5	2	2.5	78	97.5
21	9	22.5	31	77.5	3	3.8	77	96.3	3	3.8	77	96.3
22	14	35.0	26	65.0	26	32.5	54	67.5	65	81.3	15	18.8
23	4	10.0	36	90.0	14	17.5	66	82.5	6	7.5	74	92.5
24	5	12.5	35	87.5	9	11.3	71	88.8	20	25.0	60	75.0
25	23	57.5	17	42.5	38	47.5	42	52.5	69	86.3	11	13.8
26	16	40.0	24	60.0	63	78.8	17	21.3	12	15.0	68	85.0
27	10	25.0	30	75.0	6	7.5	74	92.5	14	17.5	66	82.5
28	12	30.0	28	70.0	21	26.3	59	73.8	35	43.8	45	56.3
29	12	30.0	28	70.0	56	70.0	24	30.0	73	91.3	7	8.8
30	18	45.0	22	55.0	60	75.0	20	25.0	35	43.8	45	56.3
Total	362	30.2	838	69.8	896	37.3	1504	62.7	826	34.4	1574	65.6

Table (23): Frequency and percentage of correct answers for every item according to science, medicine and English major students

No.	Correct item	Science		Medicine		English		Total	
		Count	%	Count	%	Count	%	Count	%
1	liver	26	65.0	78	97.5	3	3.8	107	53.5
2	bile	5	12.5	8	10.0	40	50.0	53	26.5
3	bone	15	37.5	54	67.5	35	43.8	104	52.0
4	branch	6	15.0	17	21.3	7	8.8	30	15.0
5	brother	3	7.5	13	16.3	19	23.8	35	17.5
6	bread	6	15.0	8	10.0	5	6.3	19	9.5
7	business	25	62.5	48	60.0	72	90.0	145	72.5
8	woman	22	55.0	59	73.8	71	88.8	152	76.0
9	cheese	17	42.5	34	42.5	6	7.5	57	28.5
10	dream			8	10.0	7	8.8	15	7.5
11	end	6	15.0	8	10.0	6	7.5	20	10.0
12	evening	13	32.5	4	5.0	7	8.8	24	12.0
13	fog	8	20.0	10	12.5	6	7.5	24	12.0
14	hair	20	50.0	65	81.3	12	15.0	97	48.5
15	ice	15	37.5	25	31.3	22	27.5	62	31.0
16	lip	18	45.0	72	90.0	60	75.0	150	75.0
17	machine	10	25.0	9	11.3	36	45.0	55	27.5
18	milk	1	2.5	13	16.3	5	6.3	19	9.5
19	money	22	55.0	65	81.3	73	91.3	160	80.0
20	night	1	2.5	2	2.5	2	2.5	5	2.5
21	north	9	22.5	3	3.8	3	3.8	15	7.5
22	queen	14	35.0	26	32.5	65	81.3	105	52.5
23	sister	4	10.0	14	17.5	6	7.5	24	12.0
24	sight	5	12.5	9	11.3	20	25.0	34	17.0
25	summer	23	57.5	38	47.5	69	86.3	130	65.0
26	stomach	16	40.0	63	78.8	12	15.0	91	45.5
27	star	10	25.0	6	7.5	14	17.5	30	15.0
28	time	12	30.0	21	26.3	35	43.8	68	34.0
29	man	12	30.0	56	70.0	73	91.3	141	70.5
30	abdomen	18	45.0	60	75.0	35	43.8	113	56.5

High percentage of wrong answers have been shown in responses to section D, (Table 22 and 23) since 362 of science responses out of 1200 (30.2%) provided correct answers whereas 838 of them (69.8%) provided wrong answers, on the other hand 396 of medicine responses out of 2400 (37.3%) provided correct answers whereas 1504 of them (62.7%) provided wrong answers. Also 826 of

English responses out of 2400 (34.4%) provided correct answers whereas 1574 of them (65.6%) provided wrong answers.

The study expects that most students answered section D since the nouns and their adjectives were in front of them, they should only put right or wrong for every item. Although the percentages of wrong answers were very high, once again students in general and regardless of their specializations encounter many difficulties in learning hybrid pairs. But there were some items which provided high percentages of correct answers in particular. Furthermore, these findings indicate that specialization in itself functions to force the students to become familiar with some of hybrid pairs than others.

Table (24): Means, standard deviations, one way ANOVA results for the effect of major on students' responses: according to section (D)

Specialization	*No.*	*Mean*	*S.O*	*F*	*Sig*
Science	40	9.05	3.18	11.520	0
Medicine	80	11.20	2.40		
English	80	10.33	1.65		

Table 24 shows that there are statistically significant differences in section D due to major variable. Once again, a quick look at Table 22 shows the following:

According to item one, 78 of medicine responses (97.5%) provided a correct answer whereas 26 of science responses (65.0%) provided a correct answer.

This is a sample of the correct answers: *The adjective of liver is hepatic.*

Nevertheless 3 of English responses (3.8%) provided a correct answer, whereas 77 of them (96.3%) provided a wrong answer. On the other hand and according to item (29) since 73 of English responses (91.3%) provided a correct answer, whereas 12 of science responses (30.0%) provided a correct answer, and 56 of

medicine responses (70.0%) provided a correct answer. In other words, EMS have high competence to answer item 29 but other respondents showed lack of knowledge in answering this item especially SMS.

Sample of the wrong answers: *The adjective of man is masculine.*

Regarding the importance of learning hybrid pairs, the researcher suggested many kinds of questions which aim at covering all aspects of the study. Most of diagnostic vocabulary tests were as follows: fill in the blanks or match nouns with their irregular adjectives. The study states that matching irregular adjectives with their nouns is easy for them. This means that the researcher expects that the responses of the participant and the percentage of a correct answer to section E will be very high especially that the words in view of researcher are suitable and familiar to all majors.

This argument is further evident in responses to section E.

Look at Tables (25 and 26).

4.9 Diagnostic Vocabulary Test: Section (E)

Table (25): Match the irregular adjective derivatives with their nouns

No.	Science				Medicine				English			
	Correct Answer		Wrong Answer		Correct Answer		Wrong Answer		Correct Answer		Wrong Answer	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
1	26	65.0	14	35.0	19	23.8	61	76.3	1	1.3	79	98.8
2	8	20.0	32	80.0	22	27.5	58	72.5	29	36.3	51	63.8
3	8	20.0	32	80.0	32	40.0	48	60.0	23	28.8	57	71.3
4	10	25.0	30	75.0	16	20.0	64	80.0	44	55.0	36	45.0
5	16	40.0	24	60.0	34	42.5	46	57.5	0	0	80	100.0
6	5	12.5	35	87.5	4	5.0	76	95.0	1	1.3	79	98.8
7	0	0	40	100.0	4	5.0	76	95.0	1	1.3	79	98.8
8	3	7.5	37	92.5	14	17.5	66	82.5	7	8.8	73	91.3
9	15	37.5	25	62.5	32	40.0	48	60.0	45	56.3	35	43.8
10	0	0	40	100.0	7	8.8	73	91.3	2	2.5	78	97.5
11	2	5.0	38	95.0	2	2.5	78	97.5	5	6.3	75	93.8
12	0	0	40	100.0	2	2.5	78	97.5	0	0	80	100.0
13	12	30.0	28	70.0	27	33.8	53	66.3	38	47.5	42	52.5
14	1	2.5	39	97.5	16	20.0	64	80.0	10	12.5	70	87.5
15	5	12.5	35	87.5	0		80	100.0	0	0	80	100.0
16	0	0	40	100.0	2	2.5	78	97.5	1	1.3	79	98.8
17	11	27.5	29	72.5	11	13.8	69	86.3	17	21.3	63	78.8
18	17	42.5	23	57.5	28	35.0	52	65.0	36	45.0	44	55.0
19	2	5.0	38	95.0	13	16.3	67	83.8	26	32.5	54	67.5
20	1	2.5	39	97.5	4	5.0	76	95.0	1	1.3	79	98.8
21	9	22.5	31	77.5	4	5.0	76	95.0	1	1.3	79	98.8
22	21	52.5	19	47.5	58	72.5	22	27.5	24	30.0	56	70.0
23	4	10.0	36	90.0	18	22.5	62	77.5	6	7.5	74	92.5
24	12	30.0	28	70.0	8	10.0	72	90.0	7	8.8	73	91.3
25	13	32.5	27	67.5	11	13.8	69	86.3	30	37.5	50	62.5
26	4	10.0	36	90.0	12	15.0	68	85.0	33	41.3	47	58.8
27	0	0	40	100.0	3	3.8	77	96.3	1	1.3	79	98.8
28	9	22.5	31	77.5	10	12.5	70	87.5	1	1.3	79	98.8
29	1	2.5	39	97.5	1	1.3	79	98.8	0	0	80	100.0
30	3	7.5	37	92.5	5	6.3	75	93.8	0	0	80	100.0
Total	218	18.2	982	81.8	419	17.5	1981	82.5	390	16.3	2010	83.8

Table (26): Frequency and percentage of the correct answers for every item according to science, medicine and English major students

No.	Item and correct answer	Science		Medicine		English		Total	
		Count	%	Count	%	Count	%	Count	%
1	lucid -light	26	65.0	19	23.8	1	1.3	46	23.0
2	literal -letter	8	20.0	22	27.5	29	36.3	59	29.5
3	gradi (L) - step	8	20.0	32	40.0	23	28.8	63	31.5
4	egoistic- self	10	25.0	16	20.0	44	55.0	70	35.0
5	carnivorous- meat	16	40.0	34	42.5			50	25.0
6	crustaceous- shell	5	12.5	4	5.0	1	1.3	10	5.0
7	bellicose - war			4	5.0	1	1.3	5	2.5
8	credible - belief	3	7.5	14	17.5	7	8.8	24	12.0
9	acoustic - sound	15	37.5	32	40.0	45	56.3	92	46.0
10	cruciate - cross			7	8.8	2	2.5	9	4.5
11	decanal - dean	2	5.0	2	2.5	5	6.3	9	4.5
12	tonsorial- barber			2	2.5			2	1.0
13	juvenile - child	12	30.0	27	33.8	38	47.5	77	38.5
14	diabolic - devil	1	2.5	16	20.0	10	12.5	27	13.5
15	auroral - dawn	5	12.5					5	2.5
16	semiotic- sign			2	2.5	1	1.3	3	1.5
17	horological - clock	11	27.5	11	13.8	17	21.3	39	19.5
18	rural - countryside	17	42.5	28	35.0	36	45.0	81	40.5
19	hellenic - Greece	2	5.0	13	16.3	26	32.5	41	20.5
20	crural - leg	1	2.5	4	5.0	1	1.3	6	3.0
21	brumous- mist	9	22.5	4	5.0	1	1.3	14	7.0
22	neural - nerve	21	52.5	58	72.5	24	30.0	103	51.5
23	botanic - plant	4	10.0	18	22.5	6	7.5	28	14.0
24	ceramic - pottery	12	30.0	8	10.0	7	8.8	27	13.5
25	arboreal - tree	13	32.5	11	13.8	30	37.5	54	27.0
26	theological - religion	4	10.0	12	15.0	33	41.3	49	24.5
27	fluvial - river			3	3.8	1	1.3	4	2.0
28	costal - rib	9	22.5	10	12.5	1	1.3	20	10.0
29	nautical - sailor	1	2.5	1	1.3			2	1.0
30	veracious - truth	3	7.5	5	6.3			8	4.0

As shown in (Table 25 and 26) and according to total, 218 of science responses out of 1200 (18.2%) provided a correct answer, whereas 982 of them (81.8%) provided a wrong answer. However, 419 of medicine responses out of 2400 (17.5%) provided a correct answer, whereas 1981 of them (82.5%) provided a

wrong answer and 390 of English responses out of 2400 (16.3%) provided a correct answer whereas 2010 of them (83.8%) provided a wrong answer.

Examples of correct and wrong answers:

Irregular adjective	***nouns***	
rural	countryside	√
lucid	pottery	×

Defeating the researcher expectations, (Tables 25 and 26) show that English, science and medicine major students still encountering difficulties in learning hybrid pairs, especially when they answered section E. in testing this hypothesis which expects no significant differences due to major, means and standard deviation of the responses were calculated due to major variable, one way ANOVA was used to find any statistically significant differences in the means as shown in Table (27).

Table (27): Means, standard deviation, one way ANOVA results for the effect of major on students' responses according to section (E)

Specialization	***No.***	***Mean***	***S.D***	***F***	***Sig.***
Science	40	5.45	2.58	1.140	.322
Medicine	80	5.24	2.27		
English	80	4.88	1.66		

Table 27 shows that there are no statistically significant differences in matching the irregular adjective derivatives with nouns due to major variable, i.e. all

students (English, science, medicine) major students regardless of their specialization faced the same problems through answering section E. This belief is best explained by Nybakken (1959) by saying that not all the difficulties encountered in the study of a science are inherent in the subject matter; many are due to the terminology used.

It is worth observing, for instance, if there are specific hybrid pairs used by specific specialization since these items are familiar for some and unfamiliar for the others. Also what is the relationship between specialization and the terminology of words? No one reading these points would feel the slightest hesitation about understanding the relationship between specialization and hybrid pairs. For this reason, the researcher asked all participants to mach medical names with medical adjectives. According to the expectation of the researcher, section F would be answered correctly by medicine major students. In testing this hypothesis (Tables 28 and 29) show the following:

4.10 Diagnostic Vocabulary Test: Section (F)

Table (28): Match these medical names with medical adjectives

No.	Science				Medicine				English			
	Correct Answer		Wrong Answer		Correct Answer		Wrong Answer		Correct Answer		Wrong Answer	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
1	12	30.0	28	70.0	67	83.8	13	16.3	20	25.0	60	75.0
2	21	52.5	19	47.5	30	37.5	50	62.5	53	66.3	27	33.8
3	19	47.5	21	52.5	65	81.3	15	18.8	37	46.3	43	53.8
4	10	25.0	30	75.0	35	43.8	45	56.3	3	3.8	77	96.3
5	10	25.0	30	75.0	41	51.3	39	48.8	18	22.5	62	77.5
6	15	37.5	25	62.5	60	75.0	20	25.0	19	23.8	61	76.3
7	24	60.0	16	40.0	57	71.3	23	28.8	49	61.3	31	38.8
8	14	35.0	26	65.0	59	73.8	21	26.3	2	2.5	78	97.5
9	11	27.5	29	72.5	50	62.5	30	37.5	7	8.8	73	91.3
10	16	40.0	24	60.0	53	66.3	27	33.8	34	42.5	46	57.5
11	23	57.5	17	42.5	63	78.8	17	21.3	21	26.3	59	73.8
12	6	15.0	34	85.0	56	70.0	24	30.0	10	12.5	70	87.5
13	7	17.5	33	82.5	7	8.8	73	91.3	2	2.5	78	97.5
14	14	35.0	26	65.0	42	52.5	38	47.5	1	1.3	79	98.8
15	17	42.5	23	57.5	45	56.3	35	43.8	4	5.0	76	95.0
Total	219	36.5	381	63.5	730	60.8	470	39.2	280	23.3	920	76.7

Table (29): Frequency and percentage of correct answer for every item according to science, medicine and English major students

No.	Item and correct answer	Science		Medicine		English		Total	
		Count	%	Count	%	Count	%	Count	%
1	pain- analgesic	12	30.0	67	83.8	20	25.0	99	49.5
2	life- biological	21	52.5	30	37.5	53	66.3	104	52.0
3	stomach- gastral	19	47.5	65	81.3	37	46.3	121	60.5
4	mirror - specular	10	25.0	35	43.8	3	3.8	48	24.0
5	back - dorsal	10	25.0	41	51.3	18	22.5	69	34.5
6	toe - digital	15	37.5	60	75.0	19	23.8	94	47.0
7	disease- pathologic	24	60.0	57	71.3	49	61.3	130	65.0
8	mind - psychotic	14	35.0	59	73.8	2	2.5	75	37.5
9	sleep - hypnotic	11	27.5	50	62.5	7	8.8	68	34.0
10	fire - pyretic	16	40.0	53	66.3	34	42.5	103	51.5
11	liver- hepatic	23	57.5	63	78.8	21	26.3	107	53.5
12	jaw - maxillary	6	15.0	56	70.0	10	12.5	72	36.0
13	bone - osteoid	7	17.5	7	8.8	2	2.5	16	8.0
14	hip - sciatic	14	35.0	42	52.5	1	1.3	57	28.5
15	flat - platysmal	17	42.5	45	56.3	4	5.0	66	33.0

Tables (28 and 29) show that 219 of science responses out of 1200 (36.50%) provided a correct answer, whereas 381 of them (63.5%) provided a wrong answer. On the other hand, 280 of English responses our of 2400 (23.3%) provided a correct answer whereas 920 of them (76.7%) provided a wrong answer and 730 of medicine responses out of 2400 (60.8%) provided a correct answer whereas 470 of them (39.2%) provided a wrong answer. This means that the medicine major students were the best, but not the only ones who answered the question as the researcher expected.

It is not surprising then, that the medicine major students were the best since most of medical terms are derived from languages of culture and education which are Latin and Greek.

This is supported by Green (2008) who says that like the terminology of all the modern sciences and technologies, the vocabulary is based primarily on learned borrowings from Latin and Greek. She added:

> *"Perhaps no other area that affects our lives demonstrates so clearly the influence of Greek and Latin on English vocabulary as does the field of medicine". (Green, 2008:121)*

Table (30) also shows the differences between the three majors.

Table (30): Means, standard deviations, one way ANOVA results for the effect of major on students' responses according to section (F)

Specialization	***No.***	***Mean***	***S.D***	***F***	***Sig.***
Science	40	5.48	2.64	156.110	0
Medicine	80	9.12	2.28		
English	80	3.50	1.28		

Finally, it can be concluded that in all items and questions which were answered by participant and as a result of analyzing data, the data findings show that students face many problems in learning hybrid pairs, regardless of their specialization. On the other hand, there was also a relationship between learning hybrid pairs and specialization since the reader can guess this relationship through students' responses to section A, B, C, D and F.

To sum up the results of this study, means and standard deviation of the responses were calculated due to major variable, one way ANOVA was used to find any statistically significant differences in the means, as Table (3l) shows.

Table (31): Means, standard deviation, one way ANOVA results for the effect of major on students' responses

Questions of the study	Science		Medical		English		F	Sig.
	Mean	SD	Mean	SD	Mean	SD		
Problems	3.28	.28	3.17	.25	3.26	.32	2.542	.081
Solutions	3.77	.55	3.96	.38	3.86	.38	2.788	.064
Specializations Sec. A	9.85	6.23	14.90	7.05	10.96	5.36	11.802	.000
Specialization Sec. B	8.02	5.91	4.15	1.48	4.46	1.49	25.670	.000
Specialization Sec. C	6.55	2.23	6.54	3.52	4.90	1.65	9.187	.000
Specialization Sec. D	9.05	3.18	11.20	2.40	10.33	1.65	11.520	.000
Specialization Sec. E	5.45	2.58	5.24	2.27	4.88	1.66	1.140	.322
Specialization Sec. F	5.48	2.64	9.12	2.28	3.50	1.28	156.110	.000
Total (A-F)	44.40	15.70	51.15	11.76	39.02	8.44	22.188	.000

Table - shows the following:

- There are no statistically significant differences (α=0.05) in problems, solutions and question E due to major variable.
- There are statistically significant differences (α=0.05) in A, B, C, D and F, due to major variable, post hoc using LSD method for multiple Comparisons were used in Table 32.

Table (32): Multiple comparisons using LSD (least significant differences) method

No. of Q.	specialization	Mean	Science	Medicine	English
A	Science	9.85			
	Medicine	14.90	-5.05(*)		
	English	10.96	-1.11	3.94(*)	
B	Science	8.03			
	Medicine	4.15	3.88(*)		
	English	4.46	3.56(*)	-.31	
C	Science	6.55			
	Medicine	6.54	.01		
	English	4.90	1.65(*)	1.64(*)	
D	Science	9.05			
	Medicine	11.20	-2.15(*)		
	English	10.33	-1.27(*)	.88(*)	
F	Science	5.48			
	Medicine	9.13	-3.65(*)		
	English	3.50	1.97(*)	5.63(*)	
Total	Science	44.40			
	Medicine	51.15	-6.75(*)		
	English	39.03	5.38(*)	12.13(*)	

Table - shows the following:

- There are statistically significant differences (α=0.05) between science & medicine in favor of medicine, and between English & medicine in favor of medicine in (A)
- There are statistically significant differences (α=0.05) between science & medicine in favor of science, and between science & English in favor of science in (B).
- There are statistically significant differences (α=0.05) between English & science in favor of science, and between English & medicine in favor of medicine in (C).

* The mean difference is significant at the .050 level.

- There are statistically significant differences (α=0.05) between medicine & science in favor of medicine, between English & science in favor of English, and between English & medicine in favor of medicine in (D).
- There are statistically significant differences (α=0.05) between medicine & science in favor of medicine, between English & science in favor of science, and between English & medicine in favor of medicine in (F) and (Total). Moreover, special emphasis in this study is placed on difficulties, solutions and specializations, but particular attention is given to specialization.

Chapter Five

Conclusions and Recommendations

5.1 Introduction

This chapter represents the summary of the findings in relation to questions of the study and an abridged discussion of the findings. The researcher's project covered three main questions. She proposed that the results for research questions reveal that students encounter many difficulties in learning hybrid pairs and attempted to suggest positive solutions.

The results of the study were derived from research conducted with students at the highest level who study English, science and medicine at the University of Jordan. So this research was conducted in order to determine the difficulties and suggested solutions. In addition, this study also aimed to identify the role of specialization in mastering hybrid pairs.

In order to answer the questions of the study, the descriptive method of research was applied. Through quantitative and qualitative approaches, the researcher developed a questionnaire and diagnostic vocabulary tests to collect pertinent data. Literatures to support the findings were also integrated. The answers given by the 200 selected respondents were then analyzed by computing their weighted mean. Results were presented in tables to facilitate the analysis. The results of the survey are discussed in relation to the objectives of the study.

5.2 Summary of Results Related to the Three Questions

5.2.1 Presentation of Facts Related to Question One

What makes hybrid pairs difficult to master by English and science major students?

This study highlights that students face many difficulties in mastering hybrid pairs. These results are reported in (Tables 2, 3, 4 and 5). The data revealed that there were many reasons behind these difficulties which are outlined in the following:

(i) These words are morphologically unrelated; i.e there is no relationship between nouns and their adjectives. Such a thing caused ambiguity for most of hybrid pairs. It was difficult for students to guess the irregular adjectives of most nouns. This is in agreement with the findings of Jespersen (1982) who indicated that there are many pairs of native nouns and foreign adjectives, example: mouth→oral, town→urban and book→literary. This also agreed with Holmes (1995) who declared that English seems to be a difficult language to master with all its irregularities.

(ii) For the previous reason, it was difficult for students to understand the meaning of these words as these words are related to Latin and Greek roots. This is in agreement with the findings of Anglen (1993) who declared that

Greek and Latin words are rarely recognized, used or, understood by students.

(iii) Most of hybrid pairs are unfamiliar for students regardless of their specializations (i.e. hybrid pairs are viewed as having their own language). This result is in agreement with the results of Ayers (1986) who indicated that scientific words are unfamiliar and employed by specialists.

(iv) Moreover, hybrid pairs are difficult to pronounce since they are long and complicated. For example, the adjective of 'church' is 'ecclesiastical'. It is difficult to pronounce such words. This result particularly is in line with Theodore and Berkowiz (1967) who argued that scientific vocabulary and technical terms are often long and complicated words.

(V) Finally, based on the overall results given by the respondents, some hybrid pairs are not found in the English dictionary and most of textbooks ignore many of them. This result is clearly seen through item 5 with mean score of (3.59) and standard deviation, (99.0) and through item 18 with mean score of (3.11) and standard deviation (1.03) (See Table 2, p.58) this was what Williams (1914 indicated when he reported that most of English words are Latin since many of them do not occur in the usual serious of read books in schools. This aspect was discussed in Ayers (1986) when he said that some vocabulary building textbooks have attempted to avoid this problem by omitting from consideration those words in which such a wide variation between root meaning and current meaning occurs. He also stated that there

is a need for such books. Many texts, while they list all of the important prefixes and suffixes and a great many stems or bases, confine consideration of these to only a few lessons, and they do not give sufficient practice in recognizing these elements ever to make knowledge of them an effective tool for increasing vocabulary. These out comes are in agreement with the findings of the Krill (1990) who claimed that the word "propassible" is not found in English dictionary but its analysis and etymological history, will help understand it. He analyzed "propassible" as follows: the prefix "pro" comes from word "pro" which means before, the suffix "ible" comes from Latin word "ible" and the base "pass" comes from Latin word "passus" which means go.

5.2.2 Presentation of Facts Related to Question Two

What are the suggested solutions to overcome difficulties that English and science major students encounter in learning hybrid pairs?

Regarding the little use of hybrid pairs and the lack of knowledge of their elements, the findings show that the participants strongly believe that there should be suitable suggested solutions for difficulties that faced them in learning hybrid pairs.

High percentages of agreement have been shown in responses to all items (See Table 7, p.67) with mean score of 3.88 and standard deviation. (43.0) enhance the importance of learning hybrid pairs. Moreover, the participants are aware of

the need for mastering this kind of words. Depending on that the researcher offered ten items as suggested solutions to overcome the difficulties in mastering hybrid pairs.

As long as they valued these suggested solutions, the researcher hopes that concerned parties apply what can be applied. By giving a quick look at item (1) (See Table 7, p.67) the reader can find that participants are aware of the necessity of learning Greek and Latin prefixes, suffixes and roots. This result is in agreement with the results of Nybakken (1959) who indicated that suffixes did not exist as separate words in the Latin language, but were used as additions to roots and stems to impart changes in meaning and to create new words. This also agreed with Dinns (1960) who showed that students should learn to recognize word parts since they often give them a clue to the meaning of words. The high percentage of responses to all items proved that the suggested solutions were suitable for difficulties, regardless of specialization (See Tables 8, 9 and 10 p.68-69)

It is also noticed that the reaction of the students toward item 10 was noticeable. High percentage of agreement has been shown in responses to this item, which motivate teaching etymology i.e. most of them agreed that teaching etymology of word in Jordanian universities will be the best solution to enable them to master hybrid pairs. (See Table 7 item 10 p.67). Furthermore, we cannot ignore the role of textbooks and dictionaries in learning hybrid pairs that aim at mastering them through reading, writing and

talking, the way which motivates students to use hybrid pairs without any hesitation. This is agreement with Henno and Reiska (2010) who indicated the important role of textbooks in science class rooms and it is essential to investigate the reading levels of textbooks. Not far from this result is in line with Asimov (1959) who stated that since student no longer study Latin and Greek at school, actually discovering the meaning of words is still an exciting process of discovery. Another interesting conclusion is that the hybrid pairs should be discussed daily with students in order to remember and guess the meaning of these words easily. As a result of question 2 which is associated with the suggested solutions, the researcher analyzed and discussed the findings which showed students' consciousness according to difficulties which motivated them to fetch about the solutions to enhance the importance of the process.

5.2.3 Presentation of Facts Related to Question Three

Is there a relationship between specialization and mastering hybrid pairs?

In general, students tend not to use hybrid pairs in their conversation and try to avoid using them, whereas some students such as science and medicine major students are forced to use these words, especially for they are found in their scientific texts. The study was based on data collected through a questionnaire and diagnostic vocabulary tests, since the research was applied to a group of the highest level university students. They who were distributed as follows:

Medicine major students were 80, science major students were 40 and English major students were 80. (See Table 1, p.48).

The third question of this study reported the role of specialization in learning hybrid pairs. Analysis of the data indicated that there is a relationship between specialization and learning hybrid pairs. The study also reported the role of specialization in mastering hybrid pairs. The researcher cleared this point through students' responses to sections A and C in general, and their responses to sections B and F in particular (See Table 32, p.98). The researcher focused on section B and F which were answered by medicine, dentistry, Dr. Pharmacy, biology physics, medical analysis, chemistry and English major students since these two sections improved that there was a relationship between specialization and hybrid pairs (See Table 33, p.107).

Tables (33 and 34)

Diagnostic vocabulary test section B according to medicine, dentistry, pharmacy, Dr. Pharmacy, physics, medical analysis, chemistry, biology and English major students.

See if you can guess the animal referred to by each of the following adjectives. Please match the adjectives with its animal name.

Table (33)

No.	Adjective	No.	Animal name
1	lagomorphic		eagle
2	piscine		Butterfly
3	apian		Crow
4	bovine		Donkey
5	leonine		Bat
6	equine		Peacock
7	lupine		Bird
8	canine		Bear
9	otarine		Calf
10	feline		Goat
11	ranine		Snake
12	cervine		Mouse
13	arachnoid		Sheep
14	porcine		Fox
15	simian		Owl
16	strigine		Monkey
17	vulpine		Pig
18	ovine		Spider
19	murine		Deer
20	serpentine		Frog
21	caprine		Cat
22	vituline		Seal
23	ursine		Dog
24	aviary		Wolf
25	pavonine		Horse
26	chiropteran		Lion
27	asinine		Cow
28	corvine		Bee
29	lepidopterous		Fish
30	aquiline		Rabbit

Table (34)

Notes	Major	Correct answer		Wrong answer	
		Count /total	%	Count /total	%
20respondents 30 items 20X30=600 responses	Medicine	66	22.0	234	78.0
20respondents 30 items 20X30=600 responses	Dentistry	51	11.3	399	88.7
20respondents 30 items 20X30=600 responses	Pharmacy	123	16.4	627	83.6
20respondents 30 items 20X30=600 responses	D. pharmacy	53	11.8	397	88.2
10respondents 30 items 10X30=300 responses	physics	49	16.3	251	83.7
10respondents 30 items 10X30=300 responses	Medical analysis	105	14.0	665	86.0
10respondents 30 items 10X30=300 responses	Chemistry	76	25.3	224	74.7
10respondents 30 items 10X30=300 responses	Biology	130	43.3	170	56.7
80respondents 30 items 80X30=2400 responses	English	357	14.9	2043	85.1

From these findings, the researcher found that there is a relationship between specialization and learning hybrid pairs, since most of these words are

scientific vocabulary and related to Greek and Latin elements. These results are in line with Nybakken's theory (1959) that indicated:

> *"Most of the technical words used in medicine and dentistry have their origins in the Greek and Latin languages, and over two-thirds of present-day medical English is derived from Greek alone. (Nybakken, 1959:24)".*

Another important consideration was the variety of answers, because they were answered by different specializations. Based on that, medical terms were mastered by medicine major students more than by English major students. An interesting contrast may be seen between biology major students and others specializations. The results indicated that biology major students were better than others at section B because this section dealt with the life of animals. Findings also agree with Ayers (1986) who stated:

> *"Science figures so largely in present-day life that even the general student should have some acquaintance with its language and should acquire the ability to analyze its complex terms". (Ayers, 1986:257)*

The answers of section B by all participants indicated the following:

1- Biology major students were the highest, since 105 of responses (43.3%) out of 300 provided a correct answer.
2- They have got the highest percentage because section B in particular is related to life of animals i.e there is a relationship between biology and mastering this section.
3- English major students encountered many difficulties, this because of the lack of scientific vocabulary. 357 responses out of 2400 (14.9%) provided a correct answer, whereas 2043 (85.1%) provided a wrong answer.
4- Lack of knowledge in learning hybrid pairs according to other participants.

Moreover, the answer of section F by all participants indicated the following: (See Tables: 35 and 36, p.110-111).

Table (35): Diagnostic vocabulary test section (F) according to medicine, dentistry, pharmacy,Dr. Pharmacy, physics, medical analysis, chemistry, biology and English major students.Match these medical names with their medical adjectives.

Answer	No.	Medical name	Letter	Medical adjective
	1	pain	**a**	pyretic
	2	life	**b**	maxillary
	3	stomach	**c**	gastral
	4	mirror	**d**	biological
	5	back	**e**	sciatic
	6	toe	**f**	digital
	7	disease	**g**	hepatic
	8	mind	**h**	analgesic
	9	sleep	**i**	platysmal
	10	fire	**j**	specular
	11	liver	**k**	osteoid
	12	jaw	**l**	dorsal
	13	bone	**m**	pathologic
	14	hip	**n**	hypnotic
	15	flat	**o**	psychotic

1. D. pharmacy major students were the highest because this question is related to medical terms since 142 responses out of 300 responses (63.1%) provided a correct answer.
2. Again, English major students encountered many difficulties since all items are related to scientific vocabulary. Furthermore, 280 responses out of 1200 (23.3%) provided a correct answer whereas 920 responses (76.7%) provided a wrong answer.

3. Science and medicine major students were better than English major students because all items are scientific vocabulary.

Table (36)

Notes	Major	Correct answer		Wrong answer	
		Count/ total	%	Count/ total	%
20 respondents 15 items 20 X 15 = 300 responses	Medicine	73	48.7	77	51.3
20 respondents 15 items 20 X 15 = 300 responses	Dentistry	135	60.0	90	40.0
20 respondents 15 items 20 X 15 = 300 responses	Pharmacy	224	59.7	151	40.3
20 respondents 15 items 20 X 15 = 300 responses	D. pharmacy	142	63.1	83	36.9
10 respondents 15 items 10 X 15 = 150 responses	Physics	38	25.3	112	74.7
10 respondents 15 items 10 X 15 = 150 responses	Medical analysis	44	29.3	106	70.7
10 respondents 15 items 10 X 15 = 150 responses	Chemistry	64	42.7	86	57.3
10 respondents 15 items 10 X 15 = 150 responses	Biology	229	61.1	146	38.9
80 respondents 15 items 80 X 15 = 1200 responses	English	280	23.3	920	76.7

5.3 Conclusion

When the term 'hybrid pairs' is applied to the adjectives used in general and particular branch of knowledge, it implies that specific rules and procedures are followed in forming and using those adjectives. In order to facilitate that, the study highlighted the difficulties that students encounter in addition to the suggested solutions for these difficulties. Undoubtedly, certain principles governing the choice of these terms since the researcher elaborated on the reasons behind these difficulties and through students' responses to questions, it was asserted that there were major reasons which caused these difficulties. First, hybrid pairs are morphologically unrelated. Secondly, lack of basic Knowledge of the words since most of them relate to Latin and Greek languages. Third, unfamiliar, long and complicated terms led students to avoid using them. Finally, most of textbooks ignore hybrid pairs.

Depending on the previous difficulties, they are highly motivated to agree with suggested solutions for such difficulties, since the agreement is, perhaps, the best explained in what Nybakken (1959) suggested for the solutions to master scientific terms.

5.4 Recommendations

At the end of this study and based on the findings, the researcher recommends the following:

1- Regarding the students' lack of knowledge of hybrid pairs, they should be more active themselves in seeking more information and discovering opportunities to develop such pairs. Thus, Students should not merely depend on the formal training provided by schools and universities in developing hybrid pairs. So they should do the following:

A- Students should read many books especially scientific ones to enhance using hybrid pairs.

B- They should use these terms in their conversation, reading and writing.

C- They also should consult specialized resources. Some of these resources are dictionaries such as Chambers Dictionary of Etymology by Chambers (1988), Webster's English dictionary by Goddes and Gresset (2003) English Concise Dictionary of English Etymology by Trayler (2007), An Etymological Dictionary of the English Language by

Skeat (2005) and A Dictionary of Foreign Words & Phrases in Current English by Bliss (1966) and Collins English dictionary by Collins (2011), since the researcher locked for most of irregular adjectives in these dictionaries. Moreover, the following books may be of great help: Greek and Latin in scientific terminology by Nybakken (1959), the Greek and Latin roots Of English by Green (2008), Growth and Structure of English Language by

Jespersen (1982) and English words from Latin and Greek Elements by Ayers (1986).

D- Study the use of hybrid pairs by analyzing their parts.

2- Furthermore, teachers should be more trained in this area since they are the key actors in performing this task in the classroom.

3- The timing of learning hybrid pairs is also a concern. The findings have indicated that most of the students and teachers avoid using these terms because there is no time to discuss or talk about long and complicated words.

4- This study has indicated that textbooks and curricula should include hybrid pairs.

5- Finally, the researcher hopes that teaching etymology of words should be included in the study plans in Jordanian universities.

5.5 Suggestions and Implications for Future Research

1- Further research could be conducted to determine the factors behind ignoring this vital area by textbook writers.

2- More research in learning hybrid pairs should be undertaken in the light of this thesis.

A- Other studies might examine the role of teachers in mastering hybrid pairs.

B- Moreover, further studies should increase the size of the sample to

Include students from different universities.

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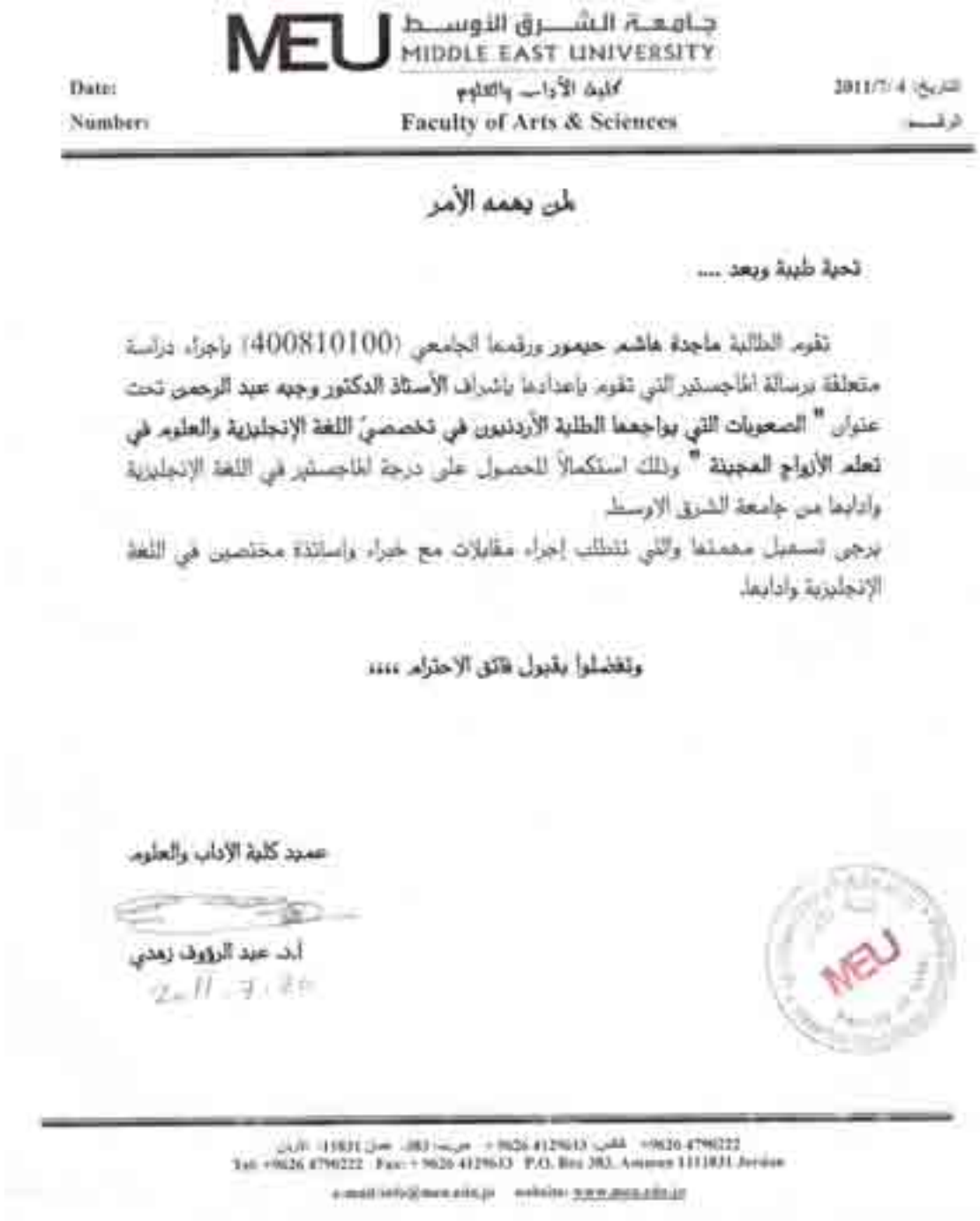
Appendix 1

Middle East University Permission Letter



جامعة الشرق الأوسط
MIDDLE EAST UNIVERSITY

Date: التاريخ: 2011/7/ 4
Number: الرقم:
كلية الآداب والعلوم
Faculty of Arts & Sciences

لمن يهمه الأمر

تحية طيبة وبعد ....

تقوم الطالبة ماجدة هاشم حيمور ورقمها الجامعي (400810100) بإجراء دراسة متعلقة برسالة الماجستير التي تقوم بإعدادها بإشراف الأستاذ الدكتور وجيه عبد الرحمن تحت عنوان " الصعوبات التي يواجهها الطلبة الأردنيون في تخصصيّ اللغة الإنجليزية والعلوم في تعلم الأزواج المجينة " وذلك استكمالاً للحصول على درجة الماجستير في اللغة الإنجليزية وادابها من جامعة الشرق الاوسط

نرجو تسهيل مهمتها والتي تتطلب إجراء مقابلات مع خبراء وأساتذة مختصين في اللغة الإنجليزية وادابها.

وتفضلوا بقبول فائق الاحترام ،،،،

عميد كلية الآداب والعلوم

أ.د. عبد الرؤوف زهدي

2011.7.20

MEU

ص.ب 383 عمان 11831 الأردن هاتف 4129613 6 9626+ فاكس 4796222 9626+
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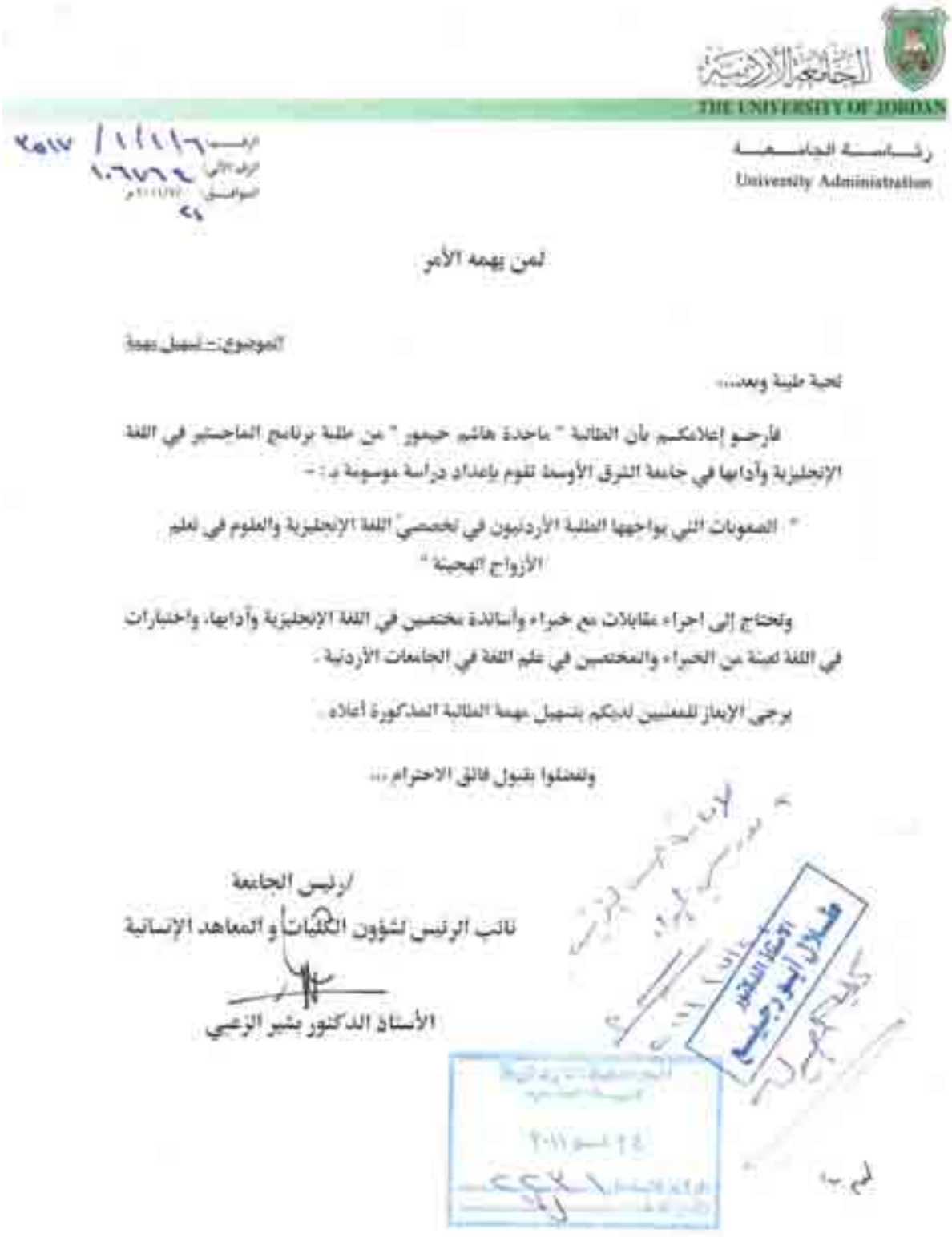
Appendix 2

The University of Jordan Permission Letter



الجامعة الأردنية
THE UNIVERSITY OF JORDAN
رئاسة الجامعة
University Administration

لمن يهمه الأمر

الموضوع:- تسهيل مهمة

تحية طيبة وبعد...

فأرجو إعلامكم بأن الطالبة " ماجدة هاشم حيمور " من طلبة برنامج الماجستير في اللغة الإنجليزية وآدابها في جامعة الشرق الأوسط تقوم بإعداد دراسة موسومة بـ :-

" الصعوبات التي يواجهها الطلبة الأردنيون في تخصصي اللغة الإنجليزية والعلوم في تعلم الأزواج الهجينة "

وتحتاج إلى اجراء مقابلات مع خبراء وأساتذة مختصين في اللغة الإنجليزية وآدابها، واختبارات في اللغة لعينة من الخبراء والمختصين في علم اللغة في الجامعات الأردنية .

يرجى الإيعاز للمعنيين لديكم بتسهيل مهمة الطالبة المذكورة أعلاه .

وتفضلوا بقبول فائق الاحترام ...

رئيس الجامعة
نائب الرئيس لشؤون الكليات و المعاهد الإنسانية
الأستاذ الدكتور بشير الزعبي

هاتف ... (٦-٥٣٥٥٠٠٠) تلفاكس ... (٦-٥٣٥٠٠٠١) عمان ١١٩٤٢ الأردن
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رئاسة الجامعة
University Administration

الموضوع: تسهيل مهمة

تحية طيبة وبعد،،،

فأرجو إعلامكم بأن الطالبة " ماجدة هاشم حيمور " من طلبة برنامج الماجستير في اللغة الإنجليزية وآدابها في جامعة الشرق الأوسط تقوم بإعداد دراسة موسومة بـ :-

" الصعوبات التي يواجهها الطلبة الأردنيون في تخصصيّ اللغة الإنجليزية والعلوم في تعلم الأزواج الهجينة "

وتحتاج إلى اجراء مقابلات مع خبراء وأساتذة مختصين في اللغة الإنجليزية وآدابها، واختبارات في اللغة لعينة من الخبراء والمختصين في تعلم اللغة في الجامعات الأردنية .

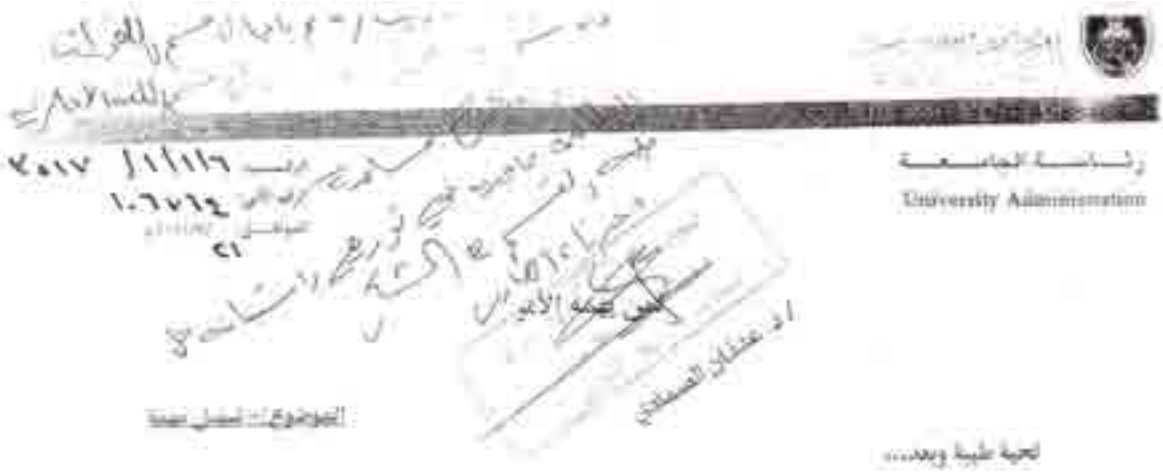
يرجى الإيعاز للمعنيين لديكم بتسهيل مهمة الطالبة المذكورة أعلاه .

وتفضلوا بقبول فائق الاحترام ،،،

/رئيس الجامعة

نائب الرئيس لشؤون الكليات والمعاهد الإنسانية

الأستاذ الدكتور بشير الزعبي



رئاسة الجامعة
University Administration

التاريخ ٢٠١٧/١١/١٦
الرقم ١٠٦٧٦٤
المرفقات ٢١

الى عميد الأعوال

الموضوع: تسهيل مهمة

تحية طيبة وبعد...

فارجو إعلامكم بأن الطالبة " ماجدة هاشم حمور " من طلبة برنامج الماجستير في اللغة الإنجليزية وآدابها في جامعة الشرق الأوسط تقوم بإعداد دراسة موسومة بـ :-

" الصعوبات التي يواجهها الطلبة الأردنيون في تخصصي اللغة الإنجليزية والعلوم في تعلم الأزواج الهجينة "

ولتحتاج إلى اجراء مقابلات مع خبراء وأساتذة مختصين في اللغة الإنجليزية وآدابها، واختبارات في اللغة لعينة من الخبراء والمختصين في علم اللغة في الجامعات الأردنية .

يرجى الإيعاز لمن يلزم لديكم بتسهيل مهمة الطالبة المذكورة أعلاه .

وتفضلوا بقبول فائق الاحترام ...

رئيس الجامعة

نائب الرئيس لشؤون الكليات والمعاهد الإنسانية

الأستاذ الدكتور بشير الوعري

هاتف ٥٣٢٦٢٣٠ (٦-٦٠٦) فاكس ٥٣٢٦٢٣٠ (٦-٦٠٦) ص.ب ١١٩٤٧ عمان ١١١٩٤ الأردن
Tel. (962-6) 5326230 Fax (962-6) 5326230 P.O.Box 119947 Amman 11194 Jordan

Appendix 3

Panel of experts and validation committee

Name	Rank	Specialization	Place of work
Dr. Zakaria Abu Hamdia	Professor	Linguistics	University of Jordan (UOJ)
Dr. Saleh Farah Freihat	Assistant Professor	TEFL Metholodology	Isra-University (ISU)
Dr. Suleiman Al-Abbas	Assistant Professor	Applied Linguistics	Al-Ahliyya Amman University (AAU)
Dr. Issam Alkayed	Assistant professor	English Language	Middle East University (MEU)
Dr. Ibrahim Abu Shhab	Assistant professor	Applied Linguistics	Al-Zaytonah University
Dr. Adnan A. Dayem	Assistant Professor	General Linguistics	Al-Isra University

Appendix 4

The validation letter

Dear Professors and doctors,

Based on your experience and advances in teaching English language, whereby you promote and determine the suitability of the questionnaire that is used for examining the student's ability in guessing hybrid pairs, you are kindly requested to assess the following questionnaire. Results of this questionnaire will be used in collecting data. My M.A thesis is titled:

(Difficulties Faced by Jordanian English and Science

Major Students in Learning Hybrid Pairs).

The instrument is a questionnaire that consists of eight parts which students will be asked to answer.

In order to answer the questions of the study, Jordanian English and Science Major Students will be asked to answer all parts of the questionnaire.

Your co-operation is highly appreciated.

Thank you

1. Does the questionnaire measure how difficult it is for Jordanian English and science major students to learn hybrid pairs?

_____

_____

2. Does the questionnaire have enough items and questions to determine problems of learning hybrid pairs?

_____

_____

3. Do you have any suggestions or comments that help improve this study?

_____

_____

Appendix 5

Demographic Information

Dear student,

For collecting information about the demographic characteristics of the sample, please fill in this form by putting an x next to your answer.

Thank you, Majeda Haimour

M.A student, MEU

Distribution of the sample according to specification

Specialization	***frequency***	***percentage***
English	80	40.0
Science	40	20.0
Medicine	80	40.0
Total	200	100.0

Appendix 6

Questionnaire

Part I: 20 items

The difficulties that encounter students in learning hybrid pairs.

Dear student,

The researcher conducts a study on investigating some difficulties faced by Jordanian English and Science Major Students in Learning Hybrid Pairs.

Given the importance of the study the researcher wishes and hopes that students answer this questionnaire to give effect to this study.

This questionnaire contains two parts both of them focus on difficulties that students face in learning hybrid pairs and their attitudes toward suggested solutions.

All information is used for the purpose of scientific research.

Your answers and contributions play a vital role in the success of this study.

Thank you

The researcher

Dear student,

In front of each question there are five answers. Please choose the suitable answer by filling the number that corresponds to difficulties in learning hybrid pairs according to the following scale:

1. Strongly disagree.
2. Disagree.
3. Uncertain.
4. Agree.
5. Strongly agree.

Thank you

Major specification: ……...

Item No.	ITEM	SA Strongly Agree	A Agree	U Uncertain	D Disagree	SD Strongly Disagree
1	Hybrid pairs are often long and complicated words.					
2	If one has an understanding of the roots of words, this will ease recognition of hybrid pairs.					
3	Hybrid pairs are irregular derivatives.					
4	Some students may meet words which are strange and unfamiliar to them because they are in specialized fields outside their own.					
5	Some hybrid pairs are not found in the English dictionary.					
6	Hybrid pairs are difficult to master.					
7	Some hybrid pairs are ambiguous.					
8	Hybrid pairs cause problems for English and science major students.					
9	Hybrid pairs are morphologically unrelated.					
10	Hybrid pairs are difficult to recognize by foreign language learners.					
11	Hybrid pairs can be viewed as having its own language.					
12	Hybrid pairs are a new language according to English and science major students.					
13	A great deal of hybrid pairs is still formed in the traditional method from Latin and Greek roots and affixes.					
14	Neoclassical compounds play an important role in forming hybrid pairs.					
15	Hybrid pairs are only used by scientists.					
16	Hybrid pairs have specialized and restricted uses.					
17	To explain phenomena, I avoid using hybrid pairs					
18	Textbooks ignore many hybrid pairs.					
19	Students have a variety of opportunities to become familiar with hybrid pairs.					
20	Sometimes you need to change some letters in Latin prefixes for correct pronunciation as hybrid pairs.					
Total	Problems (all items)					

Appendix 7

Questionnaire

Part II: 10 items

Suggested solutions according to English and science major students

Item No.	ITEM	SA Strongly Agree	A Agree	U Uncertain	D Disagree	SD Strongly Disagree
1	Knowledge of Greek and Latin prefixes, suffixes, and roots can enhance students' understanding of scientific terms.					
2	Using hybrid pairs daily with students to make the words real instead of using a list from the textbook.					
3	Using hybrid pairs associated with a unit of study.					
4	Analyzing hybrid pairs' structure helps students to determine the meaning.					
5	The most common way of creating hybrid pairs is to construct them by using Greek and Latin elements.					
6	Talking, reading, writing about science will enhance using hybrid pairs.					
7	If science is taught effectively, the result will be to reinforce using and understanding hybrid pairs.					
8	If you know the meanings of Greek and Latin roots of words, it makes them easier to remember.					
9	Reading more interesting scientific books help you to learn hybrid pairs.					
10	Teaching etymology of word in Jordanian universities.					

Appendix 8

Part III: Section (A), 30 words

Match the nouns with their irregular derivatives

Answer	No.	Noun	Letter	Derivation adjective
	1	animal	**a**	annual
	2	arm	**b**	ferrous
	3	book	**c**	lingual
	4	city	**d**	palpebral
	5	car	**e**	verbal
	6	eye	**f**	solar
	7	father	**g**	royal
	8	ghost	**h**	ecclesiastical
	9	hand	**i**	lunar
	10	heart	**j**	nominal
	11	island	**k**	spectral
	12	king	**l**	infantile
	13	law	**m**	insular
	14	moon	**n**	manual
	15	mouth	**o**	cardiac
	16	name	**p**	automotive
	17	nose	**q**	urban
	18	sun	**r**	pluvial
	19	speech	**s**	natal
	20	tooth	**t**	brachial
	21	tongue	**u**	zoological
	22	water	**v**	pontine
	23	year	**w**	nasal
	24	iron	**x**	aqueous
	25	rain	**y**	ocular
	26	baby	**z**	paternal
	27	birth	**re**	bibliographic
	28	bridge	**so**	oral
	29	church	**la**	legal
	30	eyelid	**jo**	dental

Appendix 9

Part IV: Section (B), 30 words

See if you can guess the animal referred to by each of the following adjectives. Please match the adjective with its animal name.

No.	Adjective	No.	Animal name
1	lagomorphic		eagle
2	piscine		butterfly
3	apian		crow
4	bovine		donkey
5	leonine		bat
6	equine		peacock
7	lupine		bird
8	canine		bear
9	otarine		calf
10	feline		goat
11	ranine		snake
12	cervine		mouse
13	arachnoid		sheep
14	porcine		fox
15	simian		owl
16	strigine		monkey
17	vulpine		pig
18	ovine		spider
19	murine		deer
20	serpentine		frog
21	caprine		cat
22	vituline		seal
23	ursine		dog
24	aviary		wolf
25	pavonine		horse
26	chiropteran		lion
27	asinine		cow
28	corvine		bee
29	lepidopterous		fish
30	aquiline		rabbit

Appendix 10

Part V: Section (C), 31 Words

Fill in the blanks

(fenestral, maternal, oleic, carpal, littoral, cupric, vital, vernal, mental, decimal, sartorial, dermal, mutual, tertiary, aural, pomaceous, gustatory, aerial, corporal, dextral, divine, olfactory, cervical, thermal, sylvan, matinal, filial, ferrous, tactile, diurnal, auric).

1. Without an ---------- our TV reception was poor.
2. ---------- and visual presentations are very difficult.
3. Teachers are prohibited from using ---------- punishment.
4. I did not think the original could be improved on but this was truly ----------.
5. My ---------- job is to be respectful to my parents.
6. The ---------- conduction of water is much greater than that of wool.
7. He's a ---------- patient in this hospital since he has lost his money.
8. The lungs perform a ---------- function.
9. In particular, real meat contains ---------- acid.
10. ----------, skin layer has two types of glands that produce fluids.
11. Can you turn ---------- to a fraction?
12. What are some examples of ---------- metals?
13. ---------- fruit are produced by the flower of tree.

14. ---------- chloride obtained by dissolving Cupric Chloride.

15. I complete my ---------- tasks before leaving work every day.

16. ---------- field is first dowsed.

17. The ---------- sport is good for body.

18. Her ---------- grandmother brought an apple pie one year for her birthday.

19. ---------- region separates crown and root in the tooth.

20. It is a very ---------- guitar, with a lot of attitude.

21. The ---------- nerves play an important part in the physiological and anatomical functions of the body.

22. You are an expert who has read a number of primary, secondary or ---------- sources.

23. ---------- Ketroconjuctivitis revisited: a case series of lab patients with long-term follow-up.

24. Her ---------- sense reflects a woman of intelligent taste.

25. ---------- sense lets the people respect each other.

26. The light can go through ---------- window.

27. ---------- bones, called the distal row, meets the proximal row a little further toward the fingers.

28. ---------- savings bank.

29. She sells seashells in a ---------- location.

30. English books are placed in the ---------- direction.

Appendix 11

Part VI: Section (D), 30 sentences

Write √ or X

No.	sentences	answer
1	The adjective of liver is hepatic	
2	The adjective of bible is cholic	
3	The adjective of bone is lunar	
4	The adjective of branch is ramal	
5	The adjective of brother is fraternal	
6	The adjective of bread is pilar	
7	The adjective of business is commercial	
8	The adjective of woman is feminine	
9	The adjective of cheese is lactic	
10	The adjective of dream is oneiric	
11	The adjective of end is pannary	
12	The adjective of evening is vespertine	
13	The adjective of fog is brumous	
14	The adjective of hair is osteoid	
15	The adjective of ice is glacial	
16	The adjective of lip is labial	
17	The adjective of machine is caseous	
18	The adjective of milk is estiral	
19	The adjective of money is financial	
20	The adjective of night is nocturnal	
21	The adjective of north is boreal	
22	The adjective of queen is reginal	
23	The adjective of sister is sororall	
24	The adjective of sight is ventral	
25	The adjective of summer is final	
26	The adjective of stomach gastral	
27	The adjective of star is stellar	
28	The adjective of time is temporal	
29	The adjective of man is masculine	
30	The adjective of abdomen is visual	

Appendix 12

Part VII: Section (E), 30 words

Match the irregular adjective derivatives with their nouns

Answer	No.	Irregular adjective	Latter	Nouns
	1	lucid	**a**	shell
	2	literal	**b**	dean
	3	gradual	**c**	truth
	4	egoistic	**d**	self
	5	carnivorous	**e**	leg
	6	crustaceous	**f**	religion
	7	bellicose	**g**	evil
	8	credible	**h**	war
	9	acoustic	**i**	greece
	10	cruciate	**j**	clock
	11	decanal	**k**	letter
	12	tonsorial	**l**	believe
	13	juvenile	**m**	rib
	14	satanic	**n**	cross
	15	auroral	**o**	nerve
	16	semiotic	**p**	countryside
	17	horological	**q**	child
	18	rural	**r**	dawn
	19	hellenic	**s**	river
	20	crural	**t**	mist
	21	brumous	**u**	sailor
	22	neural	**v**	sound
	23	botanic	**w**	pottery
	24	ceramic	**x**	tree
	25	arboreal	**y**	step
	26	theological	**z**	barber
	27	fluvial	**re**	plant
	28	costal	**me**	sign
	29	nautical	**so**	light
	30	veracious	**la**	meat

Appendix 13

Part VIII: Section (F), 15 words

Match these medical names with medical adjectives

Answer	No.	Medical name	Letter	Medical adjective
	1	pain	**a**	pyretic
	2	life	**b**	maxillary
	3	stomach	**c**	gastral
	4	mirror	**d**	biological
	5	back	**e**	sciatic
	6	toe	**f**	digital
	7	disease	**g**	hepatic
	8	mind	**h**	analgesic
	9	sleep	**i**	platysmal
	10	fire	**j**	specular
	11	liver	**k**	osteoid
	12	jaw	**l**	dorsal
	13	bone	**m**	pathologic
	14	hip	**n**	hypnotic
	15	flat	**o**	psychotic