INVESTIGATING EFL STUDENTS’ PERCEPTION OF METAPHOR IN SCIENTIFIC TEXTS

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doi: 10.23918/vesal2017.a1

Abstract

In our new scientific world of complex and abstract concepts, which are often not directly perceivable, we need a new way to spark better our perceiving of unfamiliar, complex and some problematic ideas that enters our lives. The only appropriate way to achieve the former aim is to use metaphor or specifically “scientific metaphor” which is considered such powerful and fundamental devices within the figurative language, that can affect in our everyday communication and thinking about scientific knowledge. Metaphor is viewed as a key element of human cognition by its importance as a crucial device which is found for helping us to perceive the new, complex and abstract concepts and make these concepts to be impactful and memorable by linking them to old concept that we already perceiving with physical senses that evolution has given us. Metaphor is applied frequently on technology and used for scientific purposes to make people more familiar when they are talking or thinking about new things. Nowadays evolution has not equipped humans to directly perceive new concepts, as a computer and internet which are highly complex new technology means used for communication. Since long and complex sentences in scientific texts and the abstract phenomena cannot be perceived, they have to be perceived imaginatively in order to explain them by using metaphors or analogies, there is a need for this study.

The main aim of this study is to investigate EFL students’ perception of metaphor in different scientific texts. The current study examines the hypothesis that the students of English as foreign language can not perceive metaphor, its source domain, the closest meaning of metaphorical expressions and literal meaning of metaphor in scientific text, it also investigates whether there is significant difference between male and female students in their perception of the same aspects and finding out EFL students level in perceiving metaphor in scientific texts. This study is limited to the students of fourth stage in English Department at Tikrit University during the academic year 2014 – 2015.

A diagnostic test has been constructed, its validity is achieved by presenting it to the jury members and its reliability has been ascertained by using Cronabach alpha formula. Percentages of the correct answers and incorrect answers to reveal the level of student’s perception. T – Test formula for independent sample has been used to find out whether there is significant difference in perception of metaphor in scientific texts between male and female students.
The obtained results indicate the following:

According to Halliday (1985: 101) a fundamental feature of language is helping human beings to build a mental image of reality, to make sense about their experience or inside them. So, The “figurative” or “non – literal” is a form of language in which this feature appears obviously. The figurative use of language has traditionally referred to the deviant use of words or phrases from everyday language usage in order to provide the readers with comparisons, symbols, substitution and patterns that shape or create something new (Trevor: 2001: 293). Generally, figures of speech were seen as stylistic decorative that the writers used them to make their language more interesting in order to force their readers to work more at making meaning in some senses “figurative” in order to perceive their messages that they intended to convey by ornament use of the literal language. Ken (2003: 141) argues that the literal usage of language gives words the meaning outside of any figure of speech. So, it preserves a stable meaning regardless of the text with the intended meaning corresponding exactly to the meaning of the individual words.

(Abram et al, 1979: 206) argues that literary texts usually concentrated their using of the figurative devices especially metaphor which is used in creative and salient ways to convey particular ideas, experiences, emotions, sights and world views. Lakoff & Turner (1989: 26 – 34) viewed that the beauty and richness of the literary writings sprang basically from the way in which the writers bring together different conventional metaphorical conceptualizations of the life and other symbolic things such as death, dream and journey. So, the magic power of metaphor comes when two disparate concepts are related and some new explanations are created. Therefore, metaphor is considered such a fundamental device that plays a crucial role in our perceiving of the world we live in. According to Trevor (2001: 293) most languages are figurative in some senses and there are very few ways of talking and writing about the world that do not make use of comparisons and symbols because some words do not have single, objective meaning of literary devices even on scientific texts. Therefore; the study of metaphor, in its origin, was not apart of the language studies; it belongs to rhetoric which started being understood mainly as a study of figures of speech. Metaphor is among these figures, whose main function is to make the message more impactive to the interlocutor, showing and asseverating ability, talent and elegance in communication. Consequently, Mio (1996: 112) insisted that scientific writings need to use metaphor to simplify complex and abstract concept by adding interest and imagery to these pieces of writing it also increases the emotional content and connections between the words and readers, which can provide richer and more fulfilling experience by its persuasive power. Leary (1990: 8) asserts that fact when he noticed that scientists typically deal with phenomena that are not just partially understood, but also complex and often inaccessible to the senses. So, their main task is, to understand and explain those phenomena and to persuade other that their understanding and explanation are valid. Metaphor in scientific writings help us to think and talk about complex subjective, and sometimes delineated areas of experience that often connected closely with our own lives. This makes scientific metaphor an essential linguistic and cognitive phenomenon which is used to persuade, reason, evaluate, explain, and theorize something offering new conceptualization of reality (Mithen, 1998: 262). Scientific metaphor is regarded as a complex issue which makes invisible process accessible and help to provide convincing account of particular phenomena. It is increasingly recognized that scientific knowledge achieved through or by means of symbolic and linguistic activity (Leary, 1990: 20).

EFL students study metaphor device in literature on their previous academic years and their instructors point out this device, but they don’t deal with it in details to make students perceive the scientific metaphor. Students’ ability in perceiving metaphor in scientific texts has not been investigated before. So, there is a need for the current study to shed light on this aspect to find out whether EFL
students are able to perceive it from other types of metaphor or not. It is worthy to mention that students at Iraqi Universities in the English departments do not study scientific metaphor in their previous academic years.

As well, many scholars and students think that metaphor is related to literary texts only. Little attention has been paid to this topic. So, this study will find out whether EFL students in the Department of English, College of Education, at University of Tikrit can perceive the real meaning of metaphorical expressions in scientific texts when they intend to explain them which leads to misunderstanding of these expressions or even may make some errors when they try to explain them far away from their exact meaning.

This study aims at:

Investigating that EFL students’ perception of metaphor in scientific texts.

The following hypotheses are put forward to be verified:

1- Students of EFL in the Department of English, College of Education, at University of Tikrit cannot perceive metaphor, its source domain and its real meaning in scientific texts.

2- There are no significant differences between male and female's perception of metaphor in scientific texts.

3- EFL student’s level in perceiving metaphor is below the average level.

The current study is limited to:

1- One language device is limited to metaphor in scientific texts only.

2- Fourth class EFL students in the Department of English, College of Education, University of Tikrit

2. Review of Related Literature

2.1. Language of Science

According to Mac Morris (1989: 31 – 33) ‘science is a systematic method of gathering knowledge’. So, the best way to perceive the nature of science is to think about scientific knowledge which is described by Bell (2008) as the ability to realize and evaluate the participations of science, and to be able to use science in decision-making on both every day and socio-scientific issues. He has specified three domains of science that are momentarily for improving scientific writings.

So, the language of science by its essence, a language in which theories are built and its characteristics are namely those that theoretical discourse probable. Generally language and science scurry together and learnedness a science is to learn a language that is found for classifying, extending, and messaging scientific knowledge as Martin (1993 a : 2000) asserts this point of view that a language in science, is an essential tool which is used to codify, analyze, interpret, and restock the investigations that build the basis of scientific word view.
Martin also showed that science cannot be perceived in our own words, it has evolved a special use of language in order to interpret the world in its own and not in common sense and terms (ibid). So, people can realize there is such a thing as a scientific language at least in written mode.

This language has its own vocabulary, norms, sets of conversation and modes of academic discourse which has to characterize a separate culture, in which one into each discipline may represent separate cultural community (Bartholomae, 1986:4-7).

Webster (2005 a, b: 221-228) directed our attention to the fact that there are some practical reasons for decomposing scientific language, the most obvious is educational one. He showed that students of all ages may find language of science intricate to be read, it can be known from various research reports in order to understand it we have to perceive how this language is structured. In scientific writing, if a text is difficult to be read, it looks that there are certain features of the way meanings are arranged, the way they are phrased, and the way that presents special problems for learners, over unfamiliar subject matter and alienation from everyday experience (Halliday 1985: 101).

Vandenberg et al (2003: 6) argues the complexity of the scientific language that is not bound to the semantic level but it is also deeply affected by arranging of private grammar items that form discourse. He believes that although technical terms are part of this overall effect, the difficulty lies more with technical terminology usually arises not from the technical terms themselves but from the complex relationship that they have between each other.

2.2. Scientific Texts

Gauche (2003: 435) shows that scientific knowledge is intimately tied to empirical results which can be gained in the form of testable explanation that can be used to foretell the findings of future experiments, whereas Martin (2010: 940) defines the scientific method as a body of techniques that used for proving phenomena, acquiring new knowledge or fettling and merging previous knowledge. So, Newton (1999: 794 – 796) argues that any text in order to be termed as a scientific text, its method of inquiry should commonly base on commensurable or empirical evidence subject to appointed principles of reasoning. It is essentially for presenting this knowledge as sets of sentences that may be used in connected stretches of language which are significant in communication, because scientific writers communicate their findings and facts being studied not by means of individual words or segments of sentences in language but by means of texts (Al-Amyri, 2007: 67).

Scientific texts generally focuses on highly technical terms, and they are bothersome to perceive due to their complexity in form and meaning (Vandenbergen et al, 2003: 217). These texts should have many textures which form the bases for unity and semantic interdependence within a text or, as expressed ‘sequential implicativeness’ (Schelloff and Sacks, 1974: 112). Any text lacks texture would simply be a bunch of isolated sentences that have no relationship to each other (Paul, 1994:210). A language usually contains a linear sequence and this linear progression of a text creates a context of meaning or contextual meaning at the paragraph level is referred to as “coherence” while internal properties of meaning are referred to as “cohesion” (Eggins, 1994: 85).
We can display such metaphors which are taken from many scientific texts that refer to the taxonomic categories of architectural, chemistry, physics, phyto-zoo—or anthropomorphic, sporting, biological, medical domains as follows:

1-adopting orphan drugs: refer to drugs which have been developed but not subject to testing and they have not approved.

2-Treatment triangle: this expression used to refer that there are three treatment options should be used.

3-Silent epidemic: this metaphor refers to “silent” meaning not being noticed or burgeoning in unseen a pathological condition.

4-Commensal bacteria: this word described bacteria as persons having meal together.

5-Medical missionaries: this expression is originally used on the domain of Religion, transferred to Medicine referring to the activity of proselytizing.

6-Mistral regurgitation: this is one example of a new metaphor which refers to the sound of blood following around improperly closed valve of the heart.

2.3. The Concept of Metaphors in Scientific Texts

Metaphor as a figure of speech, is described by Aristotle described as an issue of representation of one thing to stand for another. For example “The drug war “

Lakoff and Johnson (1980, 5) also explain metaphor as a systematic association (they called their system of metaphor the conceptual construction), or metaphor as a mapping between two conceptual domain

1- source domain as the thing itself as the concrete form.
2- target domain as something that worked and should be understood behind the metaphor as the abstraction. Thus, whenever there is a connection between source domain and target domain, metaphor will exist.

For example: “Inflation has eaten up all my savings “.

Inflation is viewed in terms of the properties of the other, it is viewed as something alive and it had the most important properties that living thing that eating to express Inflation’s hardiness on one’s savings.

These points of view lead to that metaphor is one of the most important sense devices that are used to give any text its unique depth and special character because metaphorical mapping of a source domain is happening unconsciously. So, the conceptions that are generated by this direct experiences are called embodied schemata in contrast, abstract phenomena that cannot be mapping have to be perceived imaginatively.
2.4. The Role of Metaphor in Scientific Discourse

Writers occasionally use the term “scientific discourse” when they are talking generally about ways of speaking and writing concerned with scientific topics and activities across different disciplines and genres. They also distinguish among the more specific discourses associated with particular disciplines, sub-disciplines or approaches as a “genetic discourse” which can be perceived by texts belonging to different fields, such as scientific articles, popular science articles, and textbooks (Halliday, 2004: xv). Metaphor plays a significant role in all these texts and genres. According to a common traditional view of science, scientists engage in the direct observation of phenomena, and use language to report their findings mentally and objectively.

Scientific disciplines have rigorous and explicit methods for validating ‘hypotheses’ and ‘theories’ but suggest that these activities also involve the linguistic construction of knowledge within particular genres and social practices (applying for grants, giving conference paper, writing academic articles (Myers, 1990: 32-38).

Within the traditional view of science as a neutral and objective activity, Metaphor tends to be regarded as at best irrelevant and at worst detrimental. Hobbes, famously argued that metaphors openly profess deceit, and should be excluded from reasoning, demonstration and “all rigorous search of truth” (Leary, 1990b: 8-9). This view has been progressively displaced by recognition that the use of metaphor in science is both pervasive and essential. Indeed, many scientists have themselves written that the use of metaphor in their specific disciplines (Keller, 1995: 155).

2.5 The Main Source Domains in Scientific Metaphors

Metaphors in scientific discourse can be used to offer new conceptualizations of reality by constructing something (target domain) in terms of something else (source domain). The choice of source domains in scientific discourse crucially depends on the scientist’s current understanding of particular phenomena and their attempts to present and support their intuitions or findings about the nature of these phenomena (Semino, 2008: 155-157).

Scientists utilized source domains correspond to comparatively concrete, reachable, well-structured, familiar and areas of experience. In such cases source domains may be invented for modeling specific phenomena rather than selected from familiar or concrete experience because the exploitation of known areas of experience is not necessary for successful metaphor. In other cases, source domain is structured exactly to be suited the main features of the phenomena that is styled for modeling.

The WASTE DISPOSAL metaphor is used widely for theory constitutive purpose to provide a structured model for the view of ageing as it is argued by Gems and McElwee (2005: 383) in their studies of longevity when they used the WASTE DISPOSAL source domain. For example:

“The cell is under 'constant threat' from metabolic waste products, and xenobiotics. We suggest that the smooth ER 'works' as a cellular 'filter', deploying and phase 2 metabolism to metabolize and excrete
these mainly lipophilic toxins. This clears the cell of molecular rubbish, thereby preventing molecular damage, and aging “.

**WAR / PHYSICAL CONFLICT** is conventionally used to describe disagreements, or situations in which it is difficult for different entities to co-exist such as protect, defense, attack, destroy and damage. The functioning of the immune system is conventionally explained in terms of metaphors from the source domain of **WAR / PHYSICAL CONFLICT**, generally entities such as viruses and bacteria are conventionally described as external agents that attack the body by attempting to eliminate any harmful invasion from outside (Goatly, 1997: 49 - 51).

More specifically, the ideal state of stability for the organism ‘homeostasis’ is described by metaphorical expressions draw from the **MUSIC** source domain as ‘harmony’, ‘harmonious’. e.g. 'Human body requires harmonious interactions among all its constituents'.

(Cameron, 2003: 235).

**HUMAN BEINGS AND THEIR CHARACTERISTICS / ACTIVITIES** can be used in the context of the specialized discourse of immunology, however, many of the metaphorical expressions have related to these source domain that are used in ways that are broadly compatible with each other, but each source domain captures particular aspects of the target domain. e.g.

'The heart' pumps' the air that 'pushes' the blood round the body'.

Another dominant metaphorical pattern draws from the source domain of **MACHINARY** metaphors. A range of different process are described as mechanisms ‘and the ways in which some cells affect other cells are described in terms of ‘control’ and ‘regulation’ or having a ‘regulatory’ function. **MACHINARY** metaphors often include using of such vocabularies as ‘do programmed ‘or ‘hard – wired ‘ or to describe a particular ‘mechanism’. e.g.

'There are two references to cells' being programmed' (Semino, 2008: 155).

By the source domain of **LANGUAGE/COMMUNICATION** the molecular processes are conventionally explain in terms of metaphorical expressions for example, the activation of damage is systematically described in terms of “responses “ or ‘responding’, ‘interacting’. Particular molecular are referred to as “transcription”, “signaling”, or producing ‘signal’.

**PATH / TRANSPORT SYSTEM** metaphor is used widely in scientific texts to reflect the physical experience about motion in space. The **PATH** schema supports a way of metaphorical constructing aims as destinations, ways of reaching goals as movement forward, and problems as obstacles of the movement. It includes such expressions as flow, vehicle, travelers and impediments to travel (Chilton, 2004: 204). e.g. “Blood' flows' into the strong tubes are called arteries”.

Cameron (2003: 204) argued “ technical metaphors” or as it is called **BOUNDARY** metaphors that have a primarily pedagogical function. It implies such expressions as that is used to explain the heart structure on the concept of a building, for example:

"Each heart has' four chambers with muscular walls’.

The use of “walls” is used to express the strength and protective function of the physical wall.
2.6. Problems of EFL Students' Perception of Metaphors in Scientific Texts

Writing is considered the most essential way of communication which has several forms, the most important one is the academic or scientific writing which involves mutual relations between writers and their readers. This form of writing is based on certain intricate conventions as the texts are often more lexical density which is defined according to Halliday and Martin (1993: 21) as it is a measure of how tightly or firmly the lexical items (content words) have been compacted into the grammatical structure.

Halliday and Martin asserted that a writer couldn’t possibly and apparently express and capture his intended meaning through the congruent domain using the phrase so the writer uses the metaphorical expression for sending the intended message to the readers easily and makes it impressive, vivid and intriguing for them to digest it (1993: 21).

Perceiving scientific texts in a foreign language is more required for EFL students to find out how they can perceive academic or scientific texts that are written for native speakers and how they browse through its scientific terminology and syntactic complexity by their proficiency level which is ranging from limited users to competent users of English language (Fang, 2006: 491–520).

Perception of scientific texts is viewed as interactive process between the students prior knowledge and the texts. It needs not only the knowledge of general English but also the language, and terminology of science EFL students also must be knowledgeable about scientific concepts renewed in the text (Graesser, Leon and Otero, 2012: 1-51). So, EFL students face at least two major challenges in perceiving these texts: (1) general English words (2) long and complex scientific English sentences. Metaphor can help EFL students to reach for better scientific perceiving. Most scientific terminology did not pose a big perception problem by Efl students as they had often unpacking general English words. Another challenge encountered by EFL students is long and complex general and scientific English sentences. Thus, metaphor is an important component in scientific texts that fully reflects the dynamics of the functioning of language in science and technology communication. The frequency use of metaphors in scientific language belongs to the metaphorical nature of language and the suggestive power of metaphor in this language (Norman, 1998: 108).

3-Proceduers

The practical side of this study includes choosing a sample. The sample is derived from the population. According to Ary et al (1979: 129), the Sample is a small portion selected from the population for the purpose of observation and analysis. Sixty students (twenty two male and thirty eight female) from eighty five (thirty male and fifty five female) students from Fourth year of the College of Education at Tikrit University are randomly selected to represent the sample of this study. Twenty five
male and female students are also selected randomly from the Fourth year of the College of Education at Tikrit University students for the pilot study as shown in Table 1.

**Table (1)**

**The Sample of the Study**

<table>
<thead>
<tr>
<th></th>
<th>Pilot</th>
<th>Sample</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>Female</td>
<td>55</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>25</td>
</tr>
</tbody>
</table>

In order to achieve the aims of this study a diagnostic test has been constructed to test the students’ perception of metaphor in scientific texts. The first step in the construction of the test is specification of the behavioral objectives. Table (2) shows the analysis of the behavioral objectives of the test.

**Table (2)**

**Specification of Contents, Behaviors and the Scores of the achievement Test.**

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Contents</th>
<th>Behaviors</th>
<th>scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The expressions That constitute the scientific metaphors</td>
<td>To recognize the metaphor concepts, specifically in the scientific text about the human body</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>The source domain in the underlined scientific metaphor</td>
<td>To identify the source domain types in the scientific text about the human body system</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>The closest meaning to metaphorical expressions</td>
<td>To test the students’ ability to perceive the closest meaning of the</td>
<td>30</td>
</tr>
</tbody>
</table>
Match the scientific metaphorical expressions in list (A) with its literal meaning in list (B)

To test the students capability to understand and realize the literal meaning of the metaphorical expressions by matching them to the suitable metaphors

| 4   | 20 |

According to the (40) items of this test, they are considered authentic as they have been taken from many books and textbooks which means that their content validity is already confirmed. In order to ascertain the face validity of the test in this study, the test has been submitted to a number of jurors and experts specialized in the field of methodology, linguistics and literature. The final form of the forty items is approved by the jury members. Then the test has been applied on the pilot sample of twenty five male and female students of College of Education /English Department /Tikrit University on 9th of July during the academic year 2014-2015.

Test analysis for each item of the test has been applied. Difficulty level (DL) formula* has been used to compute the difficulty level of each of the test. The discrimination power (DP) formula* is used to compute each item of the test. The reliability of the test has been ascertain by using Cronabach Alpha formula* which is the most common statistical index of internal consistency.

\[ * \text{DL} = \frac{H+L}{N} \]

where

\text{DL} = \text{Difficulty level}

\[ H = \text{Number of correct answers of higher group} \]

\[ L = \text{Number of correct answers of lower group} \]

\[ N = \text{Total number of students in both groups} \]

( Grulund, 1974 : 211 )

\[ * \text{DP} = \text{Discrimination power} \]

where

\[ \text{DP} = \frac{H + L}{1 / 2 N} \]

\[ H = \text{Number of correct answers of high group} \]
L = Number of correct answers of low group .

N = Total number of students in both groups

*Cronbach Alpha formula

\[
a = \frac{1}{l} - \frac{1}{l - 1} \prod_{i=1}^{k} \left( 1 - \frac{\sum_{j=1}^{l} y_{ij}^2}{\sum_{j=1}^{l} y_{ij}^2} \right)
\]

Where :

K = The number of components .

0-2x = the variance of the observed total test scores .

Yi = the variance of component for the current sample of persons (Devilles, 2003 v: 35 ).

After the application of the formula of the item discrimination power , it has been found that the discrimination power , “ good classroom test items have discriminating indices of ( 0.030 ) or more “ ( Ebel , 1972 : 399 ) . Therefore , The discrimination power is satisfactory and acceptable as shown in the Table ( 3 )

Table ( 3 )

The Total Difficulty Level and Discrimination power and the mean for Each Question in the Achievement Test

<table>
<thead>
<tr>
<th>Question No.</th>
<th>DF</th>
<th>DP</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>0.775</td>
<td>0.551</td>
<td>4.49</td>
</tr>
<tr>
<td>Q2</td>
<td>0.718</td>
<td>0.536</td>
<td>8.46</td>
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</tbody>
</table>
The obtained results show that the reliability index of the achievement test is (0.74) which is considered to be very good from a statistical point of view. The final version of the test has been applied and the scores have been processed statistically.

4. Analysis of Data

4.1 Students’ Total perception of metaphor in Scientific Texts

To fulfill the first aim of this study which is ‘investigating EFL students’ perception of metaphor in scientific texts in general’ and to verify the first hypothesis which reads ‘EFL students’ can not perceive metaphor ,its source domains , the closest meaning , and the literal meaning of the metaphorical expressions in scientific texts ’ . Students’ perception is analyzed . T-test formula* for dependant sample has been applied i.e., the students’ mean score is( 25.85) and the standard deviation is( 9.77). The computed t – value is( 1.914) whereas the tabulated one is (2.00) at 0.05 level of significant . The theoretical mean is 50 and degree of freedom is 59. as shown in Table ( 4 ).

Table ( 4 )
The Total Level of Students’ perception of metaphor in scientific texts

<table>
<thead>
<tr>
<th>No. of Students</th>
<th>Mean Scores</th>
<th>Standard Deviation</th>
<th>Theoretical Mean</th>
<th>T-value</th>
<th>Freedom Degree</th>
<th>Level of Significance</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Comp.</td>
<td>Tabu.</td>
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<tr>
<td>60</td>
<td>25.85</td>
<td>9.77</td>
<td>50</td>
<td>1.914</td>
<td>2.00</td>
<td>0.05</td>
</tr>
</tbody>
</table>

\[ T = \frac{X - \overline{A}}{S / \sqrt{N}} \]
Where:

- $T =$ Test value
- $A =$ theoretical mean
- $S =$ standard deviation
- $N =$ number of the subjects
- $X =$ mean scores (Heyleet, 1979:114)

Statistically, since the computed $t$ value is less than the tabulated one, it means that there is no significant difference in students’ perception of metaphor in scientific texts. The students’ level is less than (50), it means it is below pass mark. The general level in perceiving metaphor in scientific texts, the types of metaphors’ source domain, the closest meaning for the metaphorical words and the literal meaning of the metaphorical expressions indicates the students’ level of perception is not satisfied and low.

### 4.2. Male and Female Students’ Perception of Metaphors in Scientific Texts

The T-test formula for two independent samples is also used to achieve the second aim of the current study that is “finding out whether there is no significant difference in perception of metaphor in scientific texts between male and female students.” The results indicate that mean score of male students is (25.32) with a standard deviation (10.21), whereas the mean scores of female students is (26.16) with a standard deviation (9.63). The computed $t$ value is (1.725) and the tabulated $t$ value is (2.00) at the level of significant 0.05 with the degree freedom (58). Since the computed $t$ value for male and female students in this study means is less than the tabulated one, which means that there is no a significant difference between male and female students’ in their perception of metaphor in scientific texts as shown in Table (5). The second hypothesis of this study is rejected.

<table>
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<th>Table (5)</th>
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**Male and Female students’ perception of metaphors in Scientific Texts**

<table>
<thead>
<tr>
<th>Gander</th>
<th>No. of students</th>
<th>Mean Scores</th>
<th>Standard Deviation</th>
<th>$T$ Value</th>
<th>DF</th>
<th>Level of significance</th>
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<td></td>
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<td>Com.</td>
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- 13 -
### Table 6

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</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>22</td>
<td>25.32</td>
<td>10.21</td>
<td>1.725</td>
<td>2.00</td>
<td>58</td>
<td>0.05</td>
</tr>
<tr>
<td>female</td>
<td>38</td>
<td>26.16</td>
<td>9.63</td>
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</table>

### 4.3 The percentages of Students’ Responses Concerning Each Item of the Test

The frequency and percentage of the subjects' perception of each item of the test are shown in Table (6). This test consists of four questions, each question consists of (10) items. Two marks are specified for each correct item in (Q1 and Q4) and three marks for each correct item in (Q2 and Q3), while the wrong one takes zero, thus the total number of scores is (100). By this way, the test of this study consists of (40) items which are related to scientific metaphor subject which has been not studied by the student of Four year. These items are chosen carefully from various references and some of these items are modified by number of specialists in the field of English teaching.

The purpose of the question I items is to measure the student’s ability in perceiving metaphor in different scientific texts. Table (4) shows that correct responses range between (15% to 40%) whereas incorrect responses have got the highest percentage, especially (4, 6) item which have got (71% and 85%) percentage. These results indicate that students' level is very weak in perceiving metaphor in scientific texts and their perception is below the average level.

Question II measures the students' ability to identify source domain types in many scientific texts. Concerning Q2, Table (4) indicates that correct responses range between (21% to 30%). The students fail to achieve the level of success in perceiving the types of metaphor source domain, whereas the percentage of incorrect answer ranges between (50% to 65%).

Question III tests the students' abilities to perceive the closest meaning of the underlined scientific metaphor by selecting it from four multiple choice. Table (4) shows the percentages of students' correct answers only three items (5, 9, 10) have got the lowest percentages (31%, 18%, 48%), whereas other items (1, 2, 3, 4, 6, 7, 8) have been answered correctly which have got (71%, 76%, 66%, 50%, 68%, 55%, 55%), this means that students can perceive these items. Respectively, since the other are incorrect items (5, 9, 10), it means that they can not perceive the close meaning of the metaphorical expression of these items, so their level is low.
Finally, question IV measures the students ability to perceive the metaphorical expressions in one list by matching them with their literal meanings in another list. Table (4) also refers that in question four the percentages of the students’ correct answers to perceive the literal meaning of the scientific metaphor ranges between (30% to 45%) which refers that the percentage is very low, it also refers that the percentage of incorrect responses ranges between (30% to 45%) and the item (2) has got the highest percentage(45%). According to these results EFL students can not perceive the literal meaning of the scientific metaphor since they can not accomplish the level of success in all the question items. The students level is less than 50, which means that it is below pass mark.

4.4. Discussions of the Obtained Results

The statistical analysis of the results obtained from the application of the T. Test formula indicate that EFL students’ cannot perceive metaphors in scientific text in general which constitutes the widest and most important category within figurative language. The results also show that there is no significance difference between male and female students in their perception of metaphor in scientific texts.

The problematic area and weak of scientific metaphor that EFL students face are found out through the percentage of correct and incorrect responses of the students. The students have clear defaults in perceiving scientific metaphor of Q1 which is related to perceiving metaphor in specific scientific text. The results also show that Q2 about perception of the type of metaphor source domain, QV that is concerned the perception of the closest meaning of metaphor and QVI which is related to the perception of the literal meaning of metaphorical expressions are problematic. In general, there are no high percentages of correct answers. Mostly, the percentages are less than the level of success.

Students’ failure in perceiving metaphor in scientific text, which have been mentioned above, due to English syllabuses that do not pay enough attention to these areas. Besides, in the undergraduate studies, there is no attention paid to the figurative language and scientific metaphor by instructors, besides, students lack practice in scientific texts and they are not motivated to relate what they have studied with metaphor they found in their daily life.

5- Conclusions

The following conclusions are based on the findings of this study:

1- EFL students at Tikrit University/College of Education/English Department basically do not perceive scientific or academic language which contains a lot of specialized vocabularies and technical terms.
EFL students consider this language as a complex language. As a result they cannot perceive metaphor device in scientific texts.

2-The failure in perception of metaphor in scientific texts might be a scribed to several sources, namely EFL instructors and students the English literature teaching methods and pedagogical syllabuses.

3- EFL students at Tikrit University can not perceive the source domain in metaphor used in scientific texts.

4- Most of EFL student’s responses in a diagnostic test is described as weak level, since they couldn’t achieve success mark the test.

5- EFL students (male and female) have sufficient motivation to recognize metaphor in scientific texts. They had at least instrumentally motivated by their willing to watch English films or to use internet, use the computer programmers or to read English articles.

6- EFL students can not recognize that studying metaphor as an important figurative device which is literate has useful functions in raising their awareness of scientific concepts and issues.

7- Most of EFL students perception of various written texts especially scientific text is based on misunderstanding the metaphorical meaning by using incorrect translation of its literal meaning that may distort the intended meaning.

References:


Davidson, D (1979) **what metaphors mean**. In: sacks (ed) on metaphor University of Chicago press.


Internet Sources:


APPENDIX A

The Version of the Diagnostic Test Directed to the Fourth Year Tikrit University Students

Q1// Read this passage carefully. Find out the expression that constitute, scientific metaphor .

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The human body, with its multitude of complexities, requires harmonious interactions among all its constituents for the maintenance of homeostasis. Because every member of this intricate community has its own 'agenda', peaceful and productive existence is not trivial. Fortunately, the body has several means for avoiding potential and detrimental conflicts between a immune responses to self versus non—self. A fundamental strategy is ensuring that the immune cell repertoire is sufficiently devoid of those that could cause harm to self while maintaining a wide selection of those that era adept at taking stressed cell. Another level of control is provided by the active regulation of immune responses through cellular interaction and soluble mediators. These checks and balances are that essence of harmony that maintains the status quickly.

**Q2 // Recognize the source domain in the following underlined scientific metaphors whether they relate to PATH, WAR, FAME, CODE, HUMAN BEING, PHYSICAL OBJECT, WASTE DISPOSAL, INSTRUCTION, MATIONARY, MUSIC, MASHIN AS MIND, LANGUAGE /COMMUNICATION, BOUNDARY metaphors**

A // Blood is the 'body's transport system. At the center of this system is your heart. It has four chambers with muscular walls. About once a second, the walls contract and squeeze blood out of the chambers into strong tubes, called arteries. The blood is pushed around your body. As the heart relax again, its chambers fill with more blood brought back to it by other tubes, the veins. This pumping which we call a heart beat, happens every second of everyday, for as long as you live. no man–made pump is as yieldable as your heart. It can beat for 100 years or more without rest. Also, the heart is adjustable. It can beat faster or slower, and change how much blood it pump with each beat, depending one how active you are.

B // Genetic physical object. In theory babies could be genetically engineered. Their genetic material could be changed to make perfect babies. Impure genes and people could be weeded out and destroyed and those genes are not perfect would not allowed to have children.

C// My attic is a sad sight, a jumble of frayed carpet off cuts, half—empty cans of congealed paint, broken videos, dead computers and inoperative exercise bikes. Just the thought of dragging it all to the dump tiers me out.

Something similar is happening inside my body’s cells – at least according to a new theory about why we age. The rubbish is piling up, and while I could clear it all out, that would take a lot of effort. So my metabolic cleaning systems are set to ‘don’t bother’ and the result is that harmful garbage is accumulating.
Q3//Encircle the correct choice that carries the closest meaning of the underlined metaphorical expressions.

1- He is a rebellious scientific writer.
   a. not willing to follow rules
   b. unfriendly
   c. incongruent

2- Electricity was a dramatic invention.
   a. unhappy
   b. ordinary
   c. amazing

3- Results of an experiment has valuable facts.
   a. expensive
   b. fairly important
   c. important and worth

4- It was a fruitful line of a research.
   a. It has an important idea.
   b. It has a main idea with an affective writing style.
   c. It has growing the main idea as the plants grow on the field

5- The cherry tree is a sea of blooms with soft and sweet perfume.
   a. It has decorative piece of water with its plants.
   b. It has too much flowers with a wonderful scent.
   c. It has colorful flowers with quiet smell.

6- The sun is a golden plate.
   a. It is very expensive as a golden plate.
   b. It has important place "the centre" within our galaxy.
   c. It is round, bright and yellow as a golden plate.

7- Each blade of grass was a tiny bayonet pointed firmly at our bare feet.
   a. Each plant may cause harm without any intention
   b. Each plant has a harmful part on its leaf
c. Each leaf of some weed plants has its own rake that can cause harm when we are passing across.

8- The researcher kept us in the dark of his plan.
   a. His way of describing his plan was unclear.
   b. He intended to make his plan unclear in order to be secret
   c. His displaying of the plan's steps was confusing.

9- The theory collapsed after the scientist produced his new data.
   a. His theory collapsed when he could not defend his opinion rationally.
   b. His new ideas encouraged his challengers to resist his theory completely
   c. His new data was not supported with logical evidence. Thus, it leads to landslide his theory as destroying of any building.

10- He left no stone unturned in his research for the truth.
    a. He left nothing difficult it with out clarity.
    b. He did not leave any thing with out studying.
    c. He has not leave anything even the minimal facts without studying.

Q4//Match the scientific metaphorical expressions (1-10) in list A with its literal meanings(a-l) in list B.

List (A)

1- A researcher shot down his idea about nuclear power.
2- Blood flows down an artery is a train runs down a line.
3- Computer viruses affected negatively on computer system.
4- Under us the brown earth. The best bed for wonderers
5- His theory bed swan the seeds of knowledge in his readers minds
6- The bird chirp filled the empty night air.
7- An invention of a hybrid car can save energy.
8- A patient died after along battle with cancer.
9- AIDS is another headache for the medical researchers
10- The swan existing on the river is a song with accompaniment.

List (B)

a- It expresses its traveling over a period of time.

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b-It expresses the technical bacteria action as the effect on biological one on the organism body.

c-It expresses that he planted the ideas in the brains as the farmer did.

d-It describes air as a storage place for include some thing.

e-It refers that he defend his self against who attack son his ideas but he is in an indefensible point of view.

f-It describes the struggle with illness as a strong enemy and it was the usually winner.

g-It indicates to the brown piece of land which is regarded the best place for sleeping now and forever (house and grave)

h-It refers to the best choice to reduce consumption of power is using the multi-technical structures in one design.

i-It describes its voice with its motion in water as a concert.

j-It refers to the most important problems of society which requires a lot of money and effort to overcome.