KASDI MERBAH UNIVERSITY - OUARGLA-

Faculty of Letters and Languages
Department of Foreign Languages
English Section

Dissertation

Academic Master

Domain: Letters and Foreign Languages

Field: English Language and Literature and Civilization

Speciality: Applied Linguistics and English for Specific Purposes

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Title:

Considerations to Rhetorical Functions in Understanding Scientific Texts

The Case of 1st Year Master Biochemistry Students at Ouargla University

Publically defended
On: 09 /06/2014
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Academic Year: 2013-2014

Dedication

This work is dedicated to my beloved parents.

To my dearest sisters, and brother.

To all my classmates, and my friends.

To all who helped me in accomplishing this work.

Acknowledgements

First and foremost, I owe a deep and sincere gratitude to my supervisor Dr. BOUSBAÏ Abdelaziz for his efforts, guidance, and patience.

My deepest gratitude to the examiners for the time and the efforts spent in proofreading this work.

Also, my sincere thanks go to first year master students of Biochemistry at Ouargla University, who participate in the practical part of the study.

Abstract

EST students having difficulties to understand a scientific text, especially who learn English as a second or foreign language. As known, Rhetorical functions are effective techniques which help students to understand the meaning of scientific text even if they do not understand all vocabulary in the text. Accordingly, the present study attempts to investigate the effects of rhetorical functions in enhancing student's understanding. It is hypothesized that knowledge about rhetorical functions may help 'Biochemistry' students to understand scientific texts. This hypothesis is evaluated by quasi-experimental method inferred from the results of the student's tests and questionnaire. The obtained results by means of a test and questionnaire administered to the intended sample of twenty six (26) participants of first master 'Biochemistry' at Ouargla University, during the academic year 2013-2014. The pre-test is administered before planning a lesson which aims at exploiting rhetorical functions in order to understand scientific texts, followed by a post-test which is administered to the participants in order to investigate the effect of rhetorical functions. The results obtained from these three means were analyzed and compared. The outcomes of the experiment prove the hypothesis. All in all, it has been confirmed through this study that to rhetorical functions enhance students to understand scientific texts.

Key words: EST, scientific text, rhetorical functions, understanding the meaning.

List of Abbreviations

AOP: English for Occupational Purpose

EAP: English for Academic Purposes

EBE: English for Business and Economics

EFL: English as a Foreign Language

ELP: English for Legal Purposes

ELT: English Language Teaching

EMFE: English for Management, Finance and Economics

EMP: English for Medical Purposes

ESL: English as a Second Language

ESP: English for Specific Purposes

ESS: English for Social Studies

EST: English for Science and Technology

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General Introduction

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General Introduction

As long as English language is considered as the international language of science and technology, learners who use English as a second (ESL) or a foreign language (EFL) demand courses designed specifically to meet their needs and to facilitate their learning. During the studying process EFL learners have many English authentic texts to read, it is through reading they acquire much of their knowledge and understanding. Furthermore, understanding scientific texts is not an easy task. Many learners concentrate on technical vocabulary and neglect the five rhetorical functions namely: classification, definition, description, instruction, and visual-verbal relationships, which play a great role in scientific text to convey a particular meaning.

1. The Aim of Study

The present study aims at identifying and explaining the five types of rhetorical functions, and to demonstrate their effects on 1ST year master Biochemistry students' reading comprehension at University of Ouargla.

2. Statement of the Problem

Most Biology students are not aware of the role of the rhetorical functions of the scientific text to succeed in extracting the text's meaning. For this point, the following question can be asked:

To what extent rhetorical functions affect students' understanding of scientific texts?

In the light of the above question, the following hypothesis has been raised:

Knowledge about the rhetorical functions may help first year master Biochemistry students to understand the scientific texts.

3. Justification of the Study

In an open discussion with Biology student at Ouargla University about how they deal with scientific texts, it has been noticed that they face difficulties to extract the meaning out of scientific texts, especially, with new subjects.

In Biology department, mainly first master Biochemistry students, University of Ouargla, students have English's cources in order to help them to facilitate the understanding of scientific texts written in English.

According to Slinker, Todd Trimble, and Louis Trimble (1976), "Students had the following difficulties in learning to read EST discourse; an ability to comprehend the total discourse in a paragraph even when … they may understand all the words in each sentence and / or all sentences in that paragraph". (p.311)

In the light of this view, it is clear that the technical vocabulary is one feature of the scientific discourse which might help students to understand a scientific text. But there are other helpful features listed by Trimble (1985) which are the rhetorical functions, For that reason, we attempt to carry out this study aiming to see to what extent putting more focus on these rhetorical functions result in better understanding of scientific materials.

4. Methodology

In order to the test hypothesis stated above, a quasi-experimental method is adopted in this study. The first year master Biochemistry students at University of Kasdi Merbah, Ouargla are chosen to represent the sample of this study, during the academic year 2013 -2014. This group of students is pre-tested, taught and then post-tested.

The quasi- experimental method is used in both quantitative and qualitative terms to investigate the effect of rhetorical functions on student's understanding. In qualitative terms, a questionnaire is administered to twenty six (26) students to collect information about the difficulties of scientific text, and the role of rhetorical functions on understanding. In quantitative terms, a pre-test is carried out to the same group in order to evaluate their level in understanding scientific texts. After that, they received some training about how they exploit rhetorical functions to explore the text's message. Then, a post-test was given to this group. Finally, the scores of the pre-test and post-test are compared to investigate the effect of rhetorical functions on student's understanding.

5. Structure of the paper

The paper is basically divided into two main parts. The first two chapters represent the theoretical part; While, the last one represents the practical one

The first chapter presents an overview of English for Science and Technology (EST) as a branch within English for Specific Purposes (ESP), as it explores the scientific text and discourse.

The second chapter concerned with knowledge about rhetorical functions. Furthermore, it highlights some information about reading comprehension and approaches for text processing.

The third chapter is the practical part in which a questionnaire, pre-test, and a post-test are administered to first year master Biochemical students. The data obtained from these means are analyzed and interpreted to come up with a conclusion.

Chapter One

English for Science and Technology (EST)

Introduction

1. Definition of English for Specific Purposes (ESP)
2. Typology of ESP
3. Definition of EST
4. Scientific Text
5. Discourse Analysis and EST Transfer

Conclusion

Introduction

English for specific purposes (ESP) refers to the teaching and learning of English language where the goal of the learners is to use English in particular domain. EST is one of those specific domains within ESP. Teaching English for science and technology (EST) is generally regarded as one of the most significant developments in English language pedagogy. It is concerned with meeting the specific language needs of learners in various scientific and technological fields such as biology, physics, mathematics…etc. This chapter presents the definition of ESP and its types, focusing on EST. Also, it explores the two major views of analyzing EST discourse. Finally, it deals with a brief discussion about the scientific text.

1. Definition of ESP

From the 1960's, ESP developed until it reached a central position in English Language Teaching (ELT) today. Hutchinson and waters (1987) state that the emergence of ESP as new movement in English education was influenced by three central factors; the demands of a new brave world, a revolution in linguistics, and focus on the learner. In other words, when the Second World War ended, new scientific, technical and economic demands grew and English became the international language. Therefore, language teachers were obliged to meet the demands of the new learners. Besides, in linguistics domain, the demanded spotlight on communicative aspects of language and learners' needs in specific contexts. Many scholars and researchers tried to find out an understandable definition to ESP.

Hutchinson & waters define ESP as an approach rather than a product, " ESP is an approach to language teaching in which all decisions as to content and method are based on the learner's reason for learning" (ibid, p.19). According to them, the basic core of ESP is the goal of learning English.

Strevens' (1988) definition of ESP makes a distinction between four absolute characteristics and two variable characteristics. Firstly, in the four absolute characteristics, ESP consists of English language teaching which is: (1) designed to meet specific needs of the learning, (2) related in content to particular disciplines, occupational and activities, (3) centered on language appropriate to those activities in syntax, lexis, discourse, semantics and so on, and analysis of the discourse, (4) in contrast with general English. Secondly, two variables characteristics are: (1) ESP may be restricted as to the learning skills to be learned, and (2) ESP may be not taught according to any pre-ordained methodology.

At the Japan Conference on ESP (1997), Dudley-Evans clarifies the meaning of ESP, he gives an extended definition of ESP based on the modification of Strevens one. In terms of absolute characteristics, (1) ESP is designed to meet specific needs of the learners, (2) ESP makes use of the underlying methodology and activities of the disciplines it serves; and (3) ESP is centered on the language (grammar, lexis, and register), skills, discourse and genres appropriate to these activities. In terms of variable characteristics, (1) ESP may be related to or designed for specific disciplines, (2) ESP may use, in specific teaching situations, a different methodology from that of general English, (3) ESP is likely to be designed for adult learners, either at tertiary level institution or in a professional work situation, and could also be used for learners at secondary school level, (4) ESP is courses assume basic knowledge of the language system, but it can be used with beginners. Furthermore, Tomlinson (2003) defines ESP as an umbrella term that covers all the situations where the English language is taught to learners who need it whether for academic or professional purposes.

2. Typology of ESP

Most classifications of ESP are focused on two main areas which are English for Academic Purposes (EAP), and English for Occupational Purposes (EOP). In the tree of ELT designed by Hutchinson & Waters (1987), ESP is broken down into three branches: English for Science and Technology (EST), English for Business and Economics (EBE), and English for social studies (ESS). Each of these subject areas is further divided into two branches which are EAP and EOP.

Another classification of ESP is presented by Dudley-Evans & St John (1998). They argue that the major branches of ESP are EAP and EOP, and they divide these two according professional or discipline area in the following way: firstly, EAP involves English for Science and Technology Purposes (EST), English for Medical Purposes (EMP), English for Legal Purposes (ELP), and English for management, finance and economics (EMFE); secondly, EOP includes English for Professional Purposes and English for Vocational Purposes. In EAP, EST has been the main area. Also, Celce-Murcia (2001) categorizes ESP and mentioned that EST is a branch for academic purposes (EAP) along with, EMP, ELP, and EBE. While, she classifies the other branches with EOP branch.

According to Kennedy &Bolitho (1984), EAP branch refers to the situation when English language is taught within educational settings such as university or similar academic

institution. The term EOP is used when ESP is related to the teaching of English to students who need it for occupational requirements such as communicating with work-staff or reading journals, manuals, and pamphlets.

Another important category within ESP is EST. It is directly linked to scientific English, as its name suggests, it reveals a greater emphasis on the language of science and technology. This branch is directed to learners who need the English language in their specialism such as: medicine, mathematics, physics, engineering, and in professional or academic purposes. EST is the main concern in our study.

3. Definition of EST

EST is the most important variety within ESP. It is concerned with mediating the specific language needs of learners in various scientific and technological fields such as physics, chemistry, biology, mathematic, etc. It gained a great interest from researchers to set their meaning. Swales (1985) suggests that the term EST emerged in 1960, when C.L Barber published his article "Some Measurable Characteristics of Modern Scientific Prose". Swales claims that the area of EST is known to developed rapidly. As well as, it has a great interest in ways analyzing language and the variety of authentic teaching materials.

On the other hand, Dudley-Evans & St John (1998) argue that EST is the main area within ESP which is concerned with meeting the specific language needs of the learners in various scientific and technological fields. According to Miller (2014), EST belongs to the ESP context and he adds that scientific English is the language used in biology, physics, and engineering.

4. Scientific text

For Widdowson (1974), scientific text is a particular realization of a universal mode of communication, as long as it has a number of non-verbal devices which are used in any language such as tables, graphs, and diagrams. Moreover, he classifies the scientific text into three types. Firstly, science as a discipline, this type of text is directed to peers where there is some assumed- shared knowledge. Secondly, science as a subject, this type is used by teachers to science students, it is available in textbooks. Thirdly, science as a topic of interest, it is produced by journalists to layman, it is existed at newspaper or journals.

According to Trimble (1985), "an EST text is concerned only with the presentation of facts, hypotheses, and similar types of information. It is not concerned with the forms of written English that editorialize, express emotions or emotionally based argument or are fictional or poetic in nature" (p.10). Also, Wood (2001) affirms that the scientific text has a finite rhetorical structure, and that scientists manipulate their texts to achieve a particular rhetorical purpose.

5. Discourse Analysis and EST Transfer

The development in teaching English tailored to specific needs required a development in the world of linguistics research to analyze the language oriented to specific learners with specific needs. Linguists moved in their analysis from register analysis (level at sentence) to discourse analysis (level beyond the sentence) which is known also as rhetorical analysis. The major figures associated with discourse based- approaches to EST are Henry Widdowson, and Louis Trimble. Discourse analysis is concerned with understanding how sentences were combined in discourse to produce meaning.

The view of widdowson (1974) to scientific discourse is interpreted by his theory "Universality of Scientific Discourse", which is based on the ideas that the most language in the world use common universal sets of concepts, methods, and procedures which are cover an essential part of scientific and technical discourse. He defines the scientific discourse as the universal mode of communicating, or universal rhetoric, which is recognized by scientific text in different language by the process of textualization.

The term Textualization refers to the whole notions, concepts and procedures that characterize the scientific discourse, among which the modes of communication are one. Textualiation is the functional realization of language, that widdowson refers to as "illocutionary acts" or scientific discourse such as description, exemplification, and generalization. For the clarification of his theory of universality of scientific discourse, Widdowson (1974) Has identified three approaches to the analysis of scientific discourse: text approach, textualization approach (the functional realization of language which seems to be the most helpful for reading comprehension, because it is concerned with analyzing the relationships between linguistic forms and their function within discourse), and the discoursal approach (rhetorical acts).

Trimble' (1985) Rhetorical Approach focuses on the rhetorical characteristics of scientific English discourse that make it different from other written English discourse. He tries to identify those characteristics and used the results of his study to develop classroom materials for non-native students in science and technical field. In order to build his view of rhetorical function, Trimble (1985) relies on three main rhetorical concepts:

1. The nature of EST paragraph
2. The rhetorical functions most commonly used in written EST discourse
3. The rhetorical techniques most commonly used in written EST discourse

Firstly, Concerning the EST paragraph, Trimble (1985) states that the notion of paragraph is the key elements and the basic unit for approaching the analysis of EST discourse. He makes a distinction between two types of paragraph: physical and conceptual paragraphs. The physical paragraph refers to "that amount of information relating to the generalization which is set off from other parts of the discourse by spacing or indentation" (p.15). The conceptual paragraph consists of all the information chosen by the writer to develop a generalization, whether this is stated or implied.

Secondly, the rhetorical functions, in facts, constitute the basis of the Rhetorical Approach. He defined it as "a name for what a given unit of discourse is trying to do" (p. 12). He presents description, definition, classification, instruction, and visual-verbal relationships as the most frequent rhetorical functions in written EST discourse.

Finally, the rhetorical techniques are those elements that join together in a piece of discourse, it divided into two types: natural order and logical order. The natural orders are those techniques that are imposed by the nature of the material and include space order, time order, and cause\effect. The logical orders are those techniques that are imposed by the writer's choice and include order of importance, comparison\contrast, exemplification, and analogy.

This approach is clearly presented in the EST Rhetorical Process Chart suggested by Trimble (1985.11), which is reproduced in what follow:

A. The objectives of the total discourse

Examples: 1. Detailing an experiment
2. Making a recommendation
3. Presenting new hypotheses or theory
4. Presenting other types of EST information

B. The general rhetorical functions that develop the objectives of level (A)

Examples: 1. Stating purpose
2. Reporting past research
3. Stating the problem
4. Presenting information on apparatus used in an experiment
   a) Description
   b) Operation
5. Presenting information on experimental procedures

C. The specific rhetorical functions that develop the general rhetorical functions of level B

Examples: 1. Description: physical, function, and process
2. Definition
3. Classification
4. Instruction
6. Visual-verbal relation

D. The rhetorical techniques that provide relationships within and between the rhetorical units of level C

Examples: I. Orders
1. Time orders
2. Space Orders
3. Causality

II. Patterns
1. Causality and result
2. Order of importance
3. Comparison and contrast
4. Analogy
5. Exemplification
6. Illustration

Figure 01: EST Rhetorical Process Chart (Trimble, 1985, p.11)

According to Trimble's Chart (1985), rhetoric exists at four level in a piece of EST discourse. Level A gives the purpose of the total discourse, this information being usually found in the introductory section of the discourse. Level B consists of those major pieces of text which make up the complete discourse. Level C is about rhetorical functions such as: description, definition, classification, instruction, and visual-verbal relationships. Level D presents the level of paragraph, the rhetorical techniques which provide relationships within

the rhetorical units of level C. It includes time order, causality, comparison, contrast, exemplification…etc.

All in all, Widdowson & Trimble have contributed in analyzing EST discourse to make it useful for EFL (English as a Foreign Language) teachers as well as learners.

Conclusion

In this chapter, we have spotlighted some theoretical issues related to English for Science and Technology (EST). We started by giving some definitions to the umbrella term 'ESP' as the origin of EST. Also, in order to show the value of EST in language teaching and in the world, we have offered classifications of ESP. Likewise, attention is turned to the definition of EST from many researchers. Discourse analysis is another aspect which we focus on, and we have presented Henry Widdowson and Louis Trimble as the major contributors in describing the language of scientific discourse. As a final point, we moved to scientific text as the basic component of information in science language.

Chapter Two

Rhetorical Functions

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Conclusion

Introduction

Learners confront many difficulties in order to understand the meaning of scientific text, and they care for reducing it. For that reason, the rhetorical functions are considered as the important features in scientific text that help student to understand. There are five types of rhetorical functions; each type has its effect on the meaning. While reading, learners may use them in order to simplify the meaning.

This chapter is devoted to provide knowledge about the term of rhetorical functions. Firstly, it deals with the definition of rhetorical functions. Secondly, it spotlights the five types of it: definition, description, classification, instruction, and visual-verbal relationships with providing some examples. Finally, it deals with reading, reading comprehension, and approaches for processing a text.

1. Definition of Rhetorical Functions

Rhetorical functions can be seen as a strategy of presenting a subject, and the way of organizing information in a text. Trimble's (1985), he defines rhetorical functions "a name for what a given units of discourse trying to do" (p.12). He also presents the most current rhetorical functions in scientific text which are: definition, description, classification, instruction, and visual-verbal relationships. Rhetoric is the process a writer uses to produce an organized information for a specific set of purposes for a whole piece of text. These functions have an important role in interactive discourse; because it helps the reader by facilitating the comprehension of scientific texts. For De Beaugrand & Dressler (1981), rhetorical functions contribute to text monitoring and management.

In relation to science sight, rhetorical functions have an important use. The scientific method represents a series of steps from describing, classifying, and defining a phenomenon of research. So, language is needed to express these procedures in written form. Moreover, the reader is interested in the meaning of words and phrase, and also in the communicative purpose of these words to accomplish the meaning of the whole text (Pearson, 1998).

1.1. The Rhetoric of Definition

Definition is one of the most important frequently employed in scientific thinking and reporting processes. The writer needs to define the technical terms when the reader is unfamiliar with the subject. Definition in a piece of writing can keep the reader interested and it helps him to overcome ambiguity in a text.

For Pfeiffer (2005), definition is just a clarification of terms in document with large purpose. It is subdivided into four main types: formal, semi-formal, informal (non-formal), and expanded definition.

1.1.1. Formal Definition

Trimble (1985) sets up the following equation to clarify this type: **A = C + D**. It means that terms A being defined by the combining of C is the class to which the term is a member, and D which refers to the sum differences given to distinguish the term from the other member that constitute the set. The formal definition gives the reader three information about the term:

1. The nature of the term being defined
2. The class to which the term belongs
3. The differences between the term and all other members of the class

For more explanation, Trimble (1985) puts the following example:

E.g. An arachnid is an invertebrate animal having eight legs extending at equal intervals from a central body (ibid, p. 80).

In this definition, the letters in the equation are: **A** refers to an arachnid, **C** refers to an invertebrate animal, and **D** refers to having eight legs extending at equal intervals from a central body.

According to Pfeiffer (2005), formal definition is used for complex words. It is a sentence that distinguishes the term from other similar terms. Formal definition includes the term, class to which the term belongs, and the distinguish features of it.

E.g. A pumper is a fire- fighting apparatus used to provide adequate pressure to propel streams of water toward a fire (ibid, p. 140).

In this example, pumper is the term being defined, fire- fighting apparatus is the class to which the term belongs, and the usage of this apparatus is the distinguish feature of it.

1.1.2. Semi- Formal Definition

Trimble (1985) mentioned that information in the semi-formal definition is less detailed. The reader can identify only: The name of the term, the difference (s) between the term and the other members of the class and the class to which the defined term belongs is left out.

E.g. An arachnid has eight legs extending at equal intervals from a central body (ibid, p. 80).

In this definition, the term is an arachnid, the difference between it and the other member of the class is that eight legs extending at equal intervals from a central body. The reader cannot know the class which the term belongs, because it is not included.

1.1.3. Non-Formal Definition

According to Pfeiffer (2005) Non formal definition, also known as informal definition is a word or brief phrase occurs in parentheses. It gives only a synonym or other minimal information about the term. Using this kind of definition without giving much details for simple terms. He also gives the following example of non-formal definition to clarify their meaning.

E.g. All grantors (persons from whom the property was obtained) are listed on the chart (ibid, p.139).

Pfeiffer, in his example, defines the grantors as the persons from whom the property was obtained, it is clear that this definition occurs in parentheses.

Also Trimble (1985) argues that most non formal definition is existed in forms of synonyms, antonyms, or negative statement. This definition offers two kinds of information: the name of the term being defined, and another word or phrase whether synonym or antonym. He also presents the following example to more explanation

E.g. An arachnid is a spider (ibid, p.80).

Arachnid is the term being defined, and term spider as a synonym for arachnid.

1.1.4. Expended Definition

The expended definition is the use of expanded information for supporting reader's understanding. This kind is characterized by the lengthy explanation that begins with formal sentence definition, then using headings and lists as helping devices, and ended by reminding the reader of definition's relevance to the whole document. The writer uses expanded definition when the reader needs more detailed information about the term (opsit, 2005).

1.2. The Rhetoric of Description

For Pfeiffer (2005), Description pays special attention to details. It is a special type of definition that focuses on parts, functions or other features. It is often aims to describe an experiment, explain how a machine work, record steps in developing a new product, or describe what happened during a field test. Description of an object or event arises in three levels: physical description, process description, and function description.

1.2.1. Physical Description

Physical description is concerned with the physical characteristics of an object by moving from one part to part and showing the relations that exist between the parts and the whole object. Trimble (1985) assumes that physical characteristics included in the physical description of an object are: shape, size, color, texture, dimension, material, volume, weight, etc. For more elucidation Pfeiffer (2005, p.166) sets the following example:

E.g. The blueprint machine is contained in a mental cabinet measuring 36 cm wide, 10cm tall, and 18cm deep

In this example the writer describes the blueprint machine by determining the mental cabinet as a part from this machine, and he also describes the mental cabinet by defining its dimensions.

1.2.2. Function Description

Function description gives the reader information relating to the purpose and function of various devices of an object. It shows the most appropriate overall plan relying on how things work not only how they look (ibid, 2005).

For Trimble (1985), function description gives the reader the functions or the purposes of using an object or devices.

E.g. The topmost knob in blueprint machine controls the speed of the paper feed (opsit, 2005, p.167).

In the above example, the topmost device is described by determining its function, which is controlling the speed of the paper feed.

1.2.3. Process Description

Process description is concerned with stating the different steps of a process by listing a series of steps presenting what should be done first, and what should come next. It is used widely with science to help the reader to understand a phenomenon and a natural process, not to perform it (Trimble, 1985). To clarify the view of process description, Pfeiffer (2005, p. 203) presents four steps of combined site investigation.

E.g. As the accompanying flowchart shows, a combined site investigation consists of these main steps:

1. Planning the program, with McDuf 's scientists and engineers and the client 's representatives
2. Reviewing existing data.
3. Completing a high – resolution geophysical survey of the site, followed by a preliminary analysis of the data.
4. Combining geophysical and engineering information into one final report for the client.

1.3. The Rhetoric of Classification

Classification means the organization of items such as: persons, places, events, objects, etc, into classes and subclasses according to a feature shared for all parts of the same class. The items to be classified are first considered with respect to an essential feature, then compared, and finally grouped in a class according to their respective similarities and differences. The classification model consists of the superordinate term (the overall word that includes all the others), the feature used for classified, and the items grouped together in a class (Svobodova, et al, 2000). It is categorized into two types: complete classification, and partial classification.

1.3.1. Complete Classification

In complete classification, the writer gives three types of information: the term being classified, the class to which the members belong, and the basis for classification. This means, that complete classification presents the different terms of the class which have relationship,

also the class to which the terms belong with additional information that exist between them, and finally the similarities or differences between them (Trimble, 1985).

E.g. All crystalline solids can be classified as members of one of fourteen crystal systems. The members of ways in which atomic arrangements can be repeated to form in solid is limited to fourteen by the geometrics of space division (ibid, 1985, p.87).

In this classification the term being classified is the crystalline solids, the class which the crystalline solids belong with is crystal system, and the basis of classification is when the atomic arrangements can be repeated to form in solid is limited to fourteen by the geometrics of space division.

1.3.2. Partial Classification

In partial classification, the writer gives only two types of information: the term being classified, the class to which the members belong. That is to say, it is not concerned with indicating the core basis that the writer follows when he classifies various items and he leaves the reader identified the basis of his classification from the whole context.

E.g. The 61 species of birds on the island are grouping into: (1) loons, (2) grebes, (3) gulls and terns, (4) cranes, rails, and coots; and (5) ducks, geese, and swans (Pfeiffer, 2005, p.167).

The classification in this example presents only the terms being defined: the 61 species of birds, and five classes to which these birds belong.

1.4. The Rhetoric of Instruction

Instruction is one of the most frequent functions used in scientific writing. Trimble (1985) asserts that the rhetoric of instruction is “The rhetoric of telling somewhat to do and how to do it to achieve a certain goal” (p. 20). In other words, it helps the reader to do certain process from a series of steps. For Pfeiffer (2005), it is a description of a sequence of steps in such a way that the reader can perform it. Also, he demonstrates that the instruction format employs numbered or bulleted lists, organized into subgroups of easily understandable units of information. The writer may be direct or indirect in presenting an instruction.

1.4.1. Direct Instruction

The direct instruction usually presents a list to proceed the goal of the instruction. It uses command with imperative form. The writer gives direct command to the reader to perform the sequence of steps (Pfeiffer, 2005).

The following example is a procedure for a method to demonstrate the external shape of bacteria in a smear preparation

E.g. 1. Prepare a very thin smear in the usual way, using a clean, grease-free slide.

2. At one end of the slide place one drop of migrosin solution (2%).

3. Take another microscope slide, lay one end on the first slide at an angle of 30° touching the drop of nigrosin, and use it to push the nigrosin across the surface of the first slide. The smear will thus be covered with a thin, even, film a dye.

4. Allow the dye to dry and examine the preparation under the oil- immersion objective (Harrigan, 1998, p. 38).

The example is an instruction presents four steps of an experiment to demonstrate the external shape of bacteria. It gives command to the reader with the imperative verb such: prepare, take, use, and allow.

1.4.2. Indirect Instruction

Indirect instruction usually presented in a paragraph form. It is based on suggestion rather than command, and it is associated with models like ‘can’, ‘should’, and ‘may’, and less often ‘must’ (Trimble, 1985). Moreover, Pfeiffer (2005) offers a danger message of installing ‘the zap 1000 keypad’ as an example of indirect instruction

E.g. Before installing or using the zap 1000, you should read this manual from front to back. You can be injured or killed by improper or careless use of this equipment (ibid, 2005, p.184).

1.5. The Rhetoric of Visual- verbal Relationships

Trimble (1985) claims that the visual-verbal relationships refers to the use of the visual aids such as: graphs, tables, charts, drawings, diagrams. It usually appears in conjunction with linguistic signs. This means that, the visual aids occurred with a written text, their aim is to translate the visual graphics into verbal component.

The visual-verbal relationship can help the reader to understand the scientific text by simplifying, reinforcing, and illustrating ideas which is either difficult or impossible to convey accurately by words or requires a big effort to be processed in the text. Furthermore, visual aids are considered as a universal mode of communication.

2. Definition of Reading

Reading is one of the essential skills in English Language Teaching (ELT). As any area of study, EST learners are exposed to read texts, lectures, articles, journals, or any sources related to their topic of interest, in order to extract meaning. Generally speaking, reading refers to the active process of extracting and interpreting information and messages from different written materials.

For Widdowson (1979:56) reading is "not a matter of extracting information from the text. Rather, it is one in which the reading activates a range of knowledge with the reader's mind that… may be defined and extended by the new information supplied by the text". This view shows that the interaction between the reader and her/ his background knowledge about the topic may help him to get the text message.

Besides, Williams (1984) equalizes reading by text's understanding. He asserts that "the process whereby one looks at and understands what has been written".

Grabe & LST Aller (2001) argue that reading assumes to be the central means for learning new information and performing better in academic tasks, learning more about subject matter or improving language abilities.

More precisely, Johnson & Hansen (2005) declare that students in science classroom read books, directions for experiments, newspaper, articles to solve problems, understand the steps in an experiment, or achieve knowledge about a topic.

3. Reading Comprehension in Foreign Languages

Comprehension is an essential part in reading, because the principal aim of reading process is to understand the meaning of written materials. According to Snow (2002. P, 7) reading comprehension is "the process of simultaneously extracting and contrasting meaning through interaction, and involvement with written language. It consists of three elements: the reader, the text, and the activity or purpose for reading".

Additionally, William (2009) argues that reading is centrally a comprehending process. He equalizes the process of 'reading' by comprehension as the main goal of reading.

These two views of comprehension give attention to the point that, the interaction between the reader and his background knowledge achieve the summit purpose of reading which is comprehension.

4. Reading Approaches for Text Processing

The reader needs two skills to get the text's message while reading, the simple identification skills, and higher level cognitive skills such as analyzing, and predicting. These skills are known as the approaches of reading: bottom-up, top-down, and interactive approach. These ways of processing a text are aimed to find out how readers translate prints into meanings. The three are needed in any reading process, but sometimes one predominates, sometimes the others.

4.1. The Bottom-up Approach

According to Nuttall (2005), this view of processing is based on text or data-driven operations. Reading is a decoding process. The reader builds up the meaning by decoding the letters, words, and language features in the texts and he understands the intensive and the local meaning of the text. In other words, they decipher the smallest linguistic units into words, words into sentences, and sentences into paragraph to proceed to the overall meaning. The reader is considered as a scientist with a magnifying glass examining the details. In brief,

4.2. The Top-Down Approach

This view of processing is based on meaning or conceptually-driven operations. The reader infers meaning by expectations and predictions based on his intelligence and experience. This processing is used to interpret assumptions and draw inferences. So, the reader anticipates what he is reading by forming hypotheses from the information displayed in the text, and combining it with his pre-existing knowledge to construct at the end a coherent structure meaning and achieves a textual comprehension. The reader is compared as an eagle's eye view of a landscape (ibid, 2005).

4.3. The Interactive Approach

It is the interaction of bottom-up and top-down processing. The bottom-up approach is used to check whether what the writer says. The top-down approach is used to predict the probable meaning. The combination of these two became known as interactive approach of reading. This processing suggests that the reading process is initiated by formulating hypotheses about meaning and by decoding letters, words, and sentences. Therefore, the reader constructs meaning by the selective use of information from all sources of meaning without adherence to any one set order (ibid,2005).

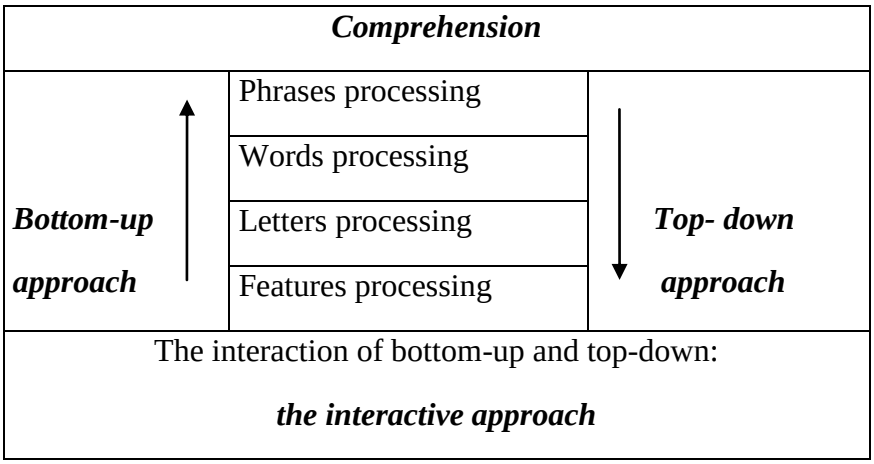

Figure (02): The Interactive Approach

Conclusion

This chapter discusses various components that provide information about rhetorical functions of a scientific text and the process of reading. Firstly, it suggests some practical definitions of rhetorical functions. Then, it focuses on the five types of rhetorical function types, definition, description, classification, instruction, and visual-verbal relationships; and it supports by some examples for more clarification. Secondly, it deals with definition of reading and reading comprehension in a foreign language, and it embodies an attention to reading approaches for processing a text.

Chapter Three: Practical Part

Introduction

1. The Sample
2. The Method
3. Means of Research
4. The Procedure
5. Analysis of the Results
    - 5.1. The Questionnaire’s Results
    - 5.2. T-testing the scores

Conclusion

Introduction

This study is carried out to check effectiveness of the rhetorical functions on understanding scientific text written in English by first year master Biochemistry students. For this purpose, a questionnaire is administered, pre-test, and post-test are design as the means of research. The findings obtained from these means are discussed qualitatively and quantitatively.

This practical part is devoted to analyze and interpret findings obtained from the means in order to refuse or confirm the suggested hypothesis; knowledge about rhetorical functions may help biochemical students to understand the scientific texts.

1. The Sample

The study took place in the department of Biology, university of Kasdi Merbah, Ouargla, during the academic year 2013 / 2014. A group of twenty-six (26) Biochemistry's students of fist year Master participated in this study. The paired sample way is opted because the control group is the experimental one. The participants are out of a total number of thirty (30) students. They are from both sexes: male and female. Age and sex are not taken into account.

2. The Method

In order to confirm the effectiveness of rhetorical functions on understanding scientific texts, a quasi- experimental method is opted for. An experiment is carried out on first year master biochemistry students at University of Kasdi Merbah, Ouargla.

3. Means of Research

In this study there are two (2) sources opted for gathering data: questionnaire, and an experiment. Firstly, the questionnaire is used to obtain information about scientific text's difficulties, and the helpfulness of rhetorical functions on understanding. It consists of ten (10) close-ended questions, and it is divided into three (3) parts as shown below:

Section one (Q1) aims at exploring the purposes of learning English in Biochemistry' field.

Section two (Q3 - Q6) aims at giving detailed information about difficulties to understand the scientific texts encountered while reading, also the technique that students go behind to get the text's meaning.

Section three (Q7 - Q10) aims at exploring if rhetorical functions: definition, description, classification, instruction, and visual-verbal relationships are helpful to understand the meaning.

Secondly, the pre-test and the post-test are used in order to gather data , and it used is to measure to what extent the rhetorical functions affect understanding level of students. The pre-test is a scientific text written by Cohen G.N, entitled: Cytoplasmic Membrane, followed by seven (7) comprehensive questions, and extracting synonyms from the text for expressions (2), and antonyms for two (2) expressions. While, the post-test also is a scientific text written by D.P. Sharma, entitled: Protozoa, followed by six (6) comprehensive questions, and extracting synonyms and antonyms form the texts for a given expressions.

4. The Procedure

Step 01: Administration of the Questionnaire

The questionnaire is administered to twenty six (26) participants of first year master Biochemistry students. The aim behind the questionnaire is to support the aim of this study and to determine the student's performance to understand scientific text.

Step 02: Administration of the Pre-test

The pre-test is developed in accordance with the classical method of ESP teacher of first master Biochemistry field. The students are asked to read the text and the questions in one (1) hour. The pre-test aims at defining the understanding level of the student following the classical method of teaching.

Step 03: Administration of the Lesson

In forty (40) minutes, the lesson is planned. The core objective of the lesson is how to make use of rhetorical functions in order to achieve meaning from scientific text. It begins with defining the rhetorical functions and identifying its five (5) types, then giving some examples.

Step 04: Administration of the Post-test

After the lesson about rhetorical functions, the students are asked to read a scientific text written in English, and then answer the questions in forty (40) minutes. The post- test aims to show the effect of rhetorical functions on understanding scientific texts.

Figure (03): The Experiment Design

5. Analysis of the Results

5.1. The Questionnaire's Results

Q01: For which purpose do you learn English?

Option	Responses	Percentages
Specific purposes	26	100%
General purposes	0	0%
Total	26	100%

Table (01): Purpose of Learning English

Table (01) shows that all students affirm that they learn English for specific purposes.

Q02: Do you read scientific texts written in English?

Option	Responses	Percentages
Never	0	0
Rarely	10	38,64%
Sometimes	13	50%
Often	02	7,69%
Always	01	3,84%
Total	26	100%

Table (02): Reading English Scientific Texts

Table (02) indicates that (38, 64%) of respondents claims that they rarely read English scientific texts. While, (50%) of them states that they sometimes do this. Whereas, (7, 69%) of respondents declares with often. In addition, (3, 84%) asserts always.

Q03: How do you find scientific text written in English?

Option	Responses	Percentages
Easy to understand	09	34,61%
Difficult to understand	17	65,38%
Total	26	100%

Table (03): Understanding Scientific Texts

Table (3) shows that (34, 61%) of respondents states that scientific text is easy to understand. While, the majority of them, (65, 38%), declares that scientific text is difficult to understand.

Q04: What makes scientific texts difficult?

Option	Responses	Percentages
The technical vocabulary	11	42,30%
Your knowledge of English language	08	30,76%
Others	07	26,92%
Total	26	100%

Table (04): Difficulties of Scientific Texts

The results in table (04) reveal that (42, 30%) of respondents have affirmed that technical vocabulary causes difficulties of scientific texts. Whereas, (30, 76%) of them refers the difficulties to their knowledge of English language. However, (26, 92%) respondents think that others factures cause the difficulties.

Q05: How do you identify the meaning of scientific text?

Option	Responses	Percentages
Focus on vocabulary	15	57,69%
Focus on the rhetoric of definition, description, classification…	07	26,92%
Both of them	04	15,38%
Total	26	100%

Table (05): Identification of Scientific Text's Meaning

Table (05) shows that (57, 69%) of respondents focus on vocabulary in order to get the meaning of scientific text. While, (26, 92%) of them claim that they focus on rhetorical functions. Also, (15, 38%) respondents declare that both vocabulary and rhetorical functions are uses to identify the meaning.

Q06: Does the rhetoric of definition help you in understanding scientific text?

Option	Responses	Percentages
Very helpful	18	69,23%
Little helpful	06	23,07%
Not helpful	02	7,69%
Total	26	100%

Table (06): The Impact of Rhetoric of Definition on Understanding

Table (06) shows that the majority of respondents, (69, 23%), argue that rhetoric of definition is very helpful. While, (23, 07%) of respondents state that it is little helpful. Whereas, (7, 69%) affirm that it is not helpful at all.

Q07: Does the rhetoric of description help you in understanding scientific text?

Option	Responses	Percentages
Very helpful	11	42,30%
Little helpful	10	38,46%
Not helpful	05	19,23%
Total	26	100%

Table (07): The Impact of Rhetoric of Description on Understanding

Table (07) shows that (42, 30%) of respondents argue that rhetoric of description is very helpful. While, (38, 46%) of respondents state that it is little helpful. Whereas, (19, 23%) assert that it is not helpful.

Q08: Does the rhetoric of classification help you in understanding scientific text?

Option	Responses	Percentages
Very helpful	15	57,69%
Little helpful	07	26,92%
Not helpful	04	15,38%
Total	26	100%

Table (08): The impact of Rhetoric of Classification on Understanding

Table (08) shows that (57, 69%) of respondents regard that rhetoric of classification is very helpful. While, (26, 92%) of respondents state that it is little helpful. Whereas, (15, 38%) claim that it is not helpful.

Q09: Does the rhetoric of instruction help you in understanding scientific text?

Option	Responses	Percentages
Very helpful	08	30,76%
Little helpful	11	42,30%
Not helpful	07	26,92%
Total	26	100%

Table (09): The Impact of Rhetoric of Instruction on Understanding

Table (09) shows that (30, 76%) of respondents consider that rhetoric of instruction is very helpful. While, (42, 30%) of respondents stated that it is little helpful. Whereas, (26, 92%) insisted on not helpful.

Q10: Does the rhetoric of visual-verbal relationships help you in understanding scientific text?

Option	Responses	Percentages
Very helpful	26	100%
Little helpful	0	0 %
Not helpful	0	0 %
Total	26	100%

Table (10): the impact of rhetoric of visual-verbal relationships on Understanding

Table (10) shows that all, (100%), of respondents affirm that rhetoric of visual-verbal relationships is very helpful in understanding scientific texts.

5.2. T-testing the Scores

This study is concerned whether to confirm or to reject the hypothesis of knowledge about rhetorical functions, which may help, first master Biochemistry students to understand the scientific text. A pre-test and a post-test have been set for a group of twenty-six (26) respondents. The following scores have been reported:

N	Pre- test scores	Post-test scores	d	d^2
01	06	08	-2	4
02	06	09	-3	9
03	07	05	2	4
04	05	08	-3	9
05	08	10	-2	4
06	09	10	-1	1
07	09	09	0	0
08	09	12	-3	9
09	10	13	-3	9
10	10	13	-3	9
11	10	14	-4	16
12	11	15	-4	16
13	11	11	0	0
14	11	13	-2	4
15	12	15	-3	9
16	12	13	-1	1
17	12	10	2	4
18	13	14	-1	1
19	15	15	0	0
20	15	17	-2	4
21	16	18	-2	4
22	16	17	-1	1
23	16	19	-3	9

24	17	18	-1	1
25	17	19	-2	4
26	18	20	-2	4
		Σd= -44		Σd²= 136

Table (11): Scores of Pre-test and Post-test

$$d = \frac{\sum d}{N} = \frac{-44}{26} = -1{,}69$$

$$sd = \sqrt{\frac{\sum d^2}{N} - (d)^2} = \sqrt{\frac{136}{26} - (-1{,}69)^2} = \sqrt{5{,}23 - 2{,}85} = \sqrt{2{,}38} = 1{,}54$$

$$sd = 1{,}54$$

$$t_{n-1} = \frac{d}{sd/\sqrt{N-1}} = \frac{-1{,}69}{1{,}54/\sqrt{26-1}} = \frac{-1{,}69}{0{,}30} = -5{,}63$$

$t_o = 5, 63$

$df = N\text{-}1 = 26\text{-}1 = 25$

5% level of significance

One tailed

$t_c = 1, 70$ $t_o = 5, 63$

$t_o > t_c$ ⟶ 5, 63 >1, 70

As observed t_o is greater than 1, 70, it is unlikely that the results could have arisen by chance. Therefore, the alternative hypothesis that "knowledge about rhetorical functions may help first master Biochemistry students to understand scientific text" is accepted. The

probability that the difference between the two means arose by chance is less than 0, 05, or 5%, i.e. 95% sure.

Conclusion

The practical part is carried out to confirm the hypothesis that knowledge about rhetorical functions may help first year master Biochemistry students to understand scientific text. In order to prove this prediction, a questionnaire, pre-test, and post-test are administered to the intended sample. The results of the study are taken from the analysis of the students's answers in the questionnaire, and the scores of pre-test and post-test. Finally, the results assume that knowledge about rhetorical functions help Biochemical students to understand scientific text. Therefore, the hypothesis is confirmed.

General Conclusion

General Conclusion

The emergence of ESP as the courses designed to meet language needs of learners, and the consideration that English is the international language of science directed the researchers to develop new courses, named EST, designed specifically to meet language needs of students in scientific field such as medicine, biology, mathematics, and physics, etc. These courses provide authentic materials, such as text…etc, to facilitate the process of learning.

Scientific students who learn English as a second or foreign language read authentic texts to improve their performance and to be familiar with the update articles, books, and journals, etc. However, they still having difficulties to understand the meaning of scientific texts.

On the light of Trimble's theory (1985) that rhetorical functions affect positively students' understanding scientific text, this study is conducted to demonstrate this view on first year master Biochemistry students.

To submit the theoretical background, a quasi- experimental method is conducted to confirm the hypothesis that knowledge about rhetorical functions may help Biochemistry students to understand scientific texts. The sample who participated in this study is first year master Biochemistry students at University of Ouargla, during the academic year 2031-2014.

A questionnaire was administered to the anticipated sample in order to collect qualitative data related to the effect of rhetorical functions on understanding. Then, a pre- test is conducted to measure the level of understanding without exposing to treatment. Next, a post-test administered after a planned lesson which aims to teach students how they exploit knowledge about rhetorical functions while reading process to understand scientific text. The scores of the two tests show that incorporating rhetorical functions in reading scientific texts improves students' understanding.

As a conclusion, the results of this study reveal the importance of rhetorical functions and their effects in improving students' understanding of scientific texts. So, it is time to give more considerations to rhetorical functions from both the parts teacher and students to overcome any difficulties in understanding scientific texts.

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Appendices

(Appendix A)

Student's Questionnaire

Dear student,

The study aimed to show the role and the importance of rhetorical functions for understanding scientific texts. Please read the questions carefully and answer the following questions. Put (**X**) in the appropriate box.

1. For which purpose do you learn English?
    a. General purposes ☐
    b. Specific purposes ☐
2. Do you read scientific texts written in English?
    a. Never ☐
    b. Rarely ☐
    c. Sometimes ☐
    d. Often ☐
    e. always ☐
3. How do you find them?
    a. Easy to understand ☐
    b. Difficult to understand ☐
4. What make these scientific texts difficult?
    a. The technical vocabulary ☐
    b. Your knowledge of English language ☐
    c. You do not concentrate on definition, classification…. ☐
5. How do you identify the meaning of the scientific text?
    a. Focus on the vocabulary ☐
    b. Focus on the rhetoric of: definition, description, classification, instruction, and visual-verbal relationships ☐
    c. Both of them ☐
6. Does the rhetoric of definition help you to understand scientific text?
    a. very helpful ☐
    b. Little helpful ☐
    c. Not helpful ☐

7. Does the rhetoric of description help you to understand scientific text?
    a. very helpful ☐
    b. Little helpful ☐
    c. Not helpful ☐

8. Does the rhetoric of classification help you to understand scientific text?
    a. very helpful ☐
    b. Little helpful ☐
    c. Not helpful ☐
9. Does the rhetoric of instruction help you to understand scientific text?
    a. very helpful ☐
    b. Little helpful ☐
    c. Not helpful ☐
10. Does the rhetoric of visual-verbal relationships help you to understand scientific text?
    a. very helpful ☐
    b. Little helpful ☐
    c. Not helpful ☐

(Appendix B)

The Pre-Test

Due time: 1 hour

The text:

The Cytoplasmic Membrane

The cytoplasmic membrane, also called cell membrane or plasma membrane, is about 7 nm thick. It lies internal to the cell wall and encloses the cytoplasm of the bacterium. Like all biological membranes in nature, the bacterial cytoplasmic membrane is composed of phospholipid and protein molecules. In electron micrographs, it appears as two dark bands separated by a light band and is actually a fluid phospholipid bilayer imbedded with proteins. With the exception of the mycoplasmas (the only bacteria that lack a cell wall), prokaryotic membranes lack sterols. Many bacteria, however, do contain sterol-like molecules called hopanoids. Like the sterols found in eukaryotic cell membranes, the hopanoids most likely stabilize the bacterial cytoplasmic membrane. The phospholipid bilayer is arranged so that its polar ends (the phosphate and glycerol portion of the phospholipids) form the outermost and innermost surface of the membrane while its hydrophobic ends (the fatty acid portions of the phospholipids) are insoluble in water.

Adapted from G.N. Cohen (2011, p. 12)

Activity One: Read the text carefully and answer the following questions:

1. What is the subject discussed in this text?

……

……

2. Is the cytoplasmic membrane recognized as plasma membrane?

……

3. Where is the plasma membrane situated?

……

……..

4. What are the main constituents of cytoplasmic membrane?

……

……...

5. What are the characteristics of mycoplasma?

……

……..

6. Is the phospholipid bilayer located in the midpoint of the cell?

……

……

7. Describe the form of cytoplasmic membrane according to the view of electron micrographs

……

……

Activity Two:

a) Find in the text words or expressions that are synonyms to:

Consist = ……. Wide = …….

b) Find from the text words or expression opposite in meaning to:

Midpoint ǂ …….. Move ǂ ……..

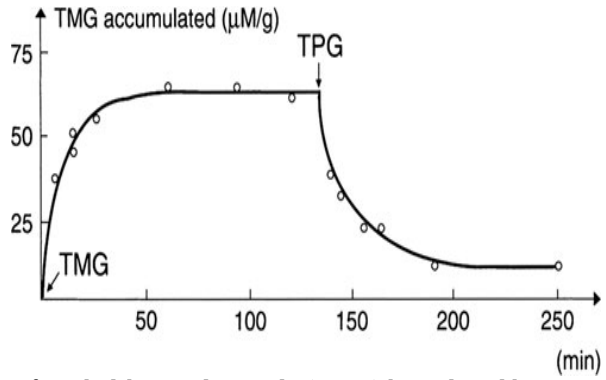
(Appendix C)

Class: 1st master Biochemistry Module: ESP

Topic: Rhetorical Functions Time: 40 minutes

Objective: At the end students will be able to understand scientific materials through exploiting Rhetorical Functions.

Procedures	Students' task
Stage one: Warm-up (5 min) - T. greets the Ss (Good morning, afternoon, hello, how are you, etc) - T distributes handouts, and he tries to introduce the topic. Then he explains briefly rhetorical functions	Ss listen Ss follow
Stage two: Listen & Speak (25 min) T writes in the board the following: *Step 1:* rhetoric of definition E.g. An arachnid has eight legs extending at equal intervals from a central body. *Step 2 :* Rhetoric of Description E.g. The blueprint machine is contained in a mental cabinet measuring 36 cm wide, 10cm tall, and 18cm deep. *Step 3:* Rhetoric of Classification E.g. The 61 species of birds on the island are grouping into: (1) loons, (2) grebes, (3) gulls and terns, (4) cranes, rails, and coots; and (5) ducks, geese, and swans. Step 4: Rhetoric of Instruction E.g**.** Before installing or using the zap 1000, you should read this manual from front to back. You can be injured or killed by improper or careless use of this equipment. Step 5: Rhetoric of visual-Verbal Relationships (for each step, teacher explains the rhetoric function, and the examples)	Ss listen and discuss
Stage four: Produce (10 min) *Step 1:* T. writes sentences and asks the Ss to explain their meaning: 1. An arachnid is an invertebrate animal having eight legs extending at equal intervals from a central body. 2. The topmost knob in blueprint machine controls the speed of the paper feed. 3. All crystalline solids can be classified as members of one of fourteen crystal systems. The members of ways in which atomic arrangements can be repeated to form in solid is limited to fourteen by the geometrics of space division. 4. 1. Prepare a very thin smear in the usual way, using a clean, grease-free slide. 2. At one end of the slide place one drop of migrosin solution (2%). 3. Take another microscope slide, lay one end on the first slide at an angle of 30° touching the drop of nigrosin, and use it to push the nigrosin across the surface of the first slide. The smear will thus be covered with a thin, even, film a dye. 4. Allow the dye to dry and examine the preparation under the oil- immersion objective.	Ss read and answer.

5.  Accumulation of methyl-b-D-galactoside (TMG) by induced bacteria. Non-radioactive b-D-phenylthio galactoside (TPG) was added at the point shown by an arrow. The experiment was carried out at 0°C to enable the kinetics to be followed. Step 2: correction of the exercise	

(Appendix D)

The Post-Test

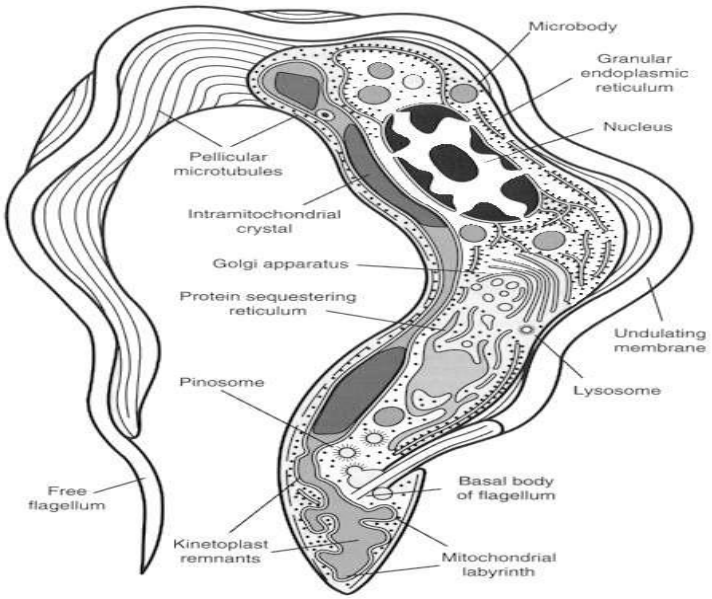
Due time: 1 hour

The text:

Protozoa

Protozoa are a group of single-celled organisms. More than 30,000 species have been reported which exist mostly in aquatic habits. They mostly live in water, damp soil or mud, in drainage ditches or puddles, in ponds or ocean.

Protozoa are microscopic unicellular eukaryotes that have a relatively complex internal structure and carry out complex metabolic activities. The cells enclosed by a membrane which in some cases surrounded by a pellicle containing chitinlike material for rigidity. Cell wall, however, is absent. True nucleus, flagella, cilia are present. Freshwater forms take in water by osmosis and eliminate it via organelles called contractile vacuoles.



The protozoa are considered to be a subkingdom of the kingdom protista. They are classified into four major classes: class Sarcodina (Amoebae), class Mastigophora (Flagellates), class Ciliophora (Ciliates), and class Sporozoa (Nonmotile forms).

Adapted from D.P. Sharma (2007,161,162)

Activity One: Read the text carefully and answer the following questions

1. Give a definition of protozoa?

   ……

   ……

2. What are the different components of protozoa's cell?

   ……

   ……

   ……

3. Are they considered as one-celled?

   ……

4. Is the amoebae one class of protozoa?

   ……

5. What are the different classes of protozoa?

   ……

   ……

6. What are salient features of protozoa?

   ……

   ……

   ……....

Activity Two:

c) Find in the text words or expressions that are synonyms to:

Survive = ……. cover = …….

Eat = …… stable = …….

d) Find from the text words or expression opposite in meaning to:

multicellular ǂ …….. External ǂ ……..

Momentary ǂ …….. Ductility ǂ ……..

الملخص

يواجه طلبة الانجليزية لهدف العلوم و التقنيات عدة صعوبات لفهم النص العلمي ،خاصة بالنسبة للطلبة الذين يدرسون الانجليزية كلغة ثانية أو أجنبية. من المعروف أن الوظائف البلاغية هي من أهم التقنيات التي تساعد الطلبة على فهم النص العلمي حتى و إن لم يفهموا كل المفردات في النص. بناءً على هذا، فإن هذه الدارسة تهدف إلى إبراز أثر الوظائف البلاغية في تحسين مستوى الفهم لدى الطلبة. ولهذا فان الافتراض المطروح هو أن هذه الوظائف اللغوية تساعد طلبة السنة أولى ماستر تخصص بيوكيمياء في فهم النص العلمي. لاختبار هذه الفرضية تم إجراء تجربة باستعمال استبيان و اختبارين اللذين وزعا على ستة و عشرين (26) طالبا من العينة المقصودة خلال السنة الدراسية 2013-2014 في جامعة ورقلة. بدايةً ، تم توزيع الاختبار الأولي قبل الشروع في إلقاء درس يهدف إلى الإشارة إلى استثمار الوظائف اللغوية في فهم النص، متبوعة باختبار نهائي لإظهار الفرق بينهما. ثم تحليل و مقارنة النتائج لإثبات الفرضية المطروحة. و في الأخير تم تأكيد الفرضية القائلة أن الوظائف اللغوية تساعد الطلبة على فهم النصوص العلمية.