Identification of Overlapping Predictive Categories: ESP Textbooks in Focus

Farahnaz Bahlooli Osguei*

Instructor, Department of English Language, Bonab Branch, Islamic Azad University, Bonab, Iran

Abstract

The notion of 'prediction' as a prospective rhetorical device in improving the reading abilities of ESP learners is significant on the basis of the assumption that once the rhetorical structure of the text is understood by the learner, he is able to use this to predict the type of forthcoming information. This study explores the possibility of linking the textual indices of 'Predictive Categories' with the understanding of content knowledge. The article reports on descriptive qualitative research based on data comprising 10 chapters from 5 textbooks in the field of Civil Engineering, applying a model of discourse analysis designed by Tadros (1981), as the method of the study, using the notion of prediction. The Six Predictive Categories introduced by Tadros (1981) underpinning the model, include Enumeration, Advance Labelling, Reporting, Recapitulation, Hypotheticality and Question were explored continuously in the selected texts. What makes this study significant is that a new Predictive Category has been identified in which two or three Predictive Categories are exactly overlapping each other. Basing our assumption on the pedagogical benefits gained by ESP learners, teachers, and material designers, it is suggested that the consciousness-raising of these categories has valuable benefits for all ESP community members.

Keywords: Prediction; Consciousness-raising; ESP Community; Rhetorical Device

1. Introduction

ESP students in any country are required to promote their reading ability in order to have efficient cooperation in a discourse community. ESP students need textbooks to help them in accessing the scientific English discourse. Unfortunately, most of these learners, especially

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* Corresponding Author's E-mail address: farahnaz.bahlooli@bonabiau.ac.ir

university students have difficulty in understanding the materials used during their studies (Kashef et al. 2014; Hayati, 2008; Nezakatgoo & Behzadpoor, 2017). The problem is more significant in Iran, where the majority of learning language activities are reading-oriented (Khashef & ModirKhameneh, 2009; Jafari & Shokrpour, 2012; Mostafaei & Ershadi, 2016). Part of this problem lies in the lack of awareness among Iranian students about the nature of scientific discourse, particularly the lack of awareness in reacting to the writer's signalling strategies (Zarrati et al., 2014). For such students there is a double concern: comprehension of the technical concepts, on the one hand, and the language carrying related information on the other hand. The gap between these two levels of language and content knowledge can leave them in a 'linguistic void' (Strapp, 1998, p.169). Student are not always qualified enough to perform their desired role in the process of reading; misreading and misunderstandings may occur. The sources are varied, e.g., inability to cope with lack of redundancy (Hoey, 1983), failure to spot prediction established by the writer (Tadros, 1994), lack of opportunity to develop academic English reading skills and strategies before entering university (Jafari & shokrpour, 2012), not using visual strategies like Knowledge map (Amer, 1994), lack of awareness about the practical rules of the given genre (Swales, 1995), and learners' inappropriate needs analysis (Nezakatgoo & Behzadpoor, 2017). But whatever the source, it seems to be 'really a problem of not recognizing the nature of signals' (Harvey, 1992, p. 115) or inadequacy to use of 'signalling words' (Meyer & Ray, 2011). The present article employs 'Predictive Categories' to highlight the notion of 'prediction', a commitment made by the writer to the reader signalled overtly in the text; the breaking of which will shake the text credibility (Tadros, 1994). Meanwhile, a new Predictive Category was observed in which two or three Predictive Categories were overlapping each other, they can be called: 'Overlapping Predictive Categories' as the main concern of this study.

2. Literature Review
2.1. Rhetorical awareness

The way of organization of thought by writer is known as 'rhetoric' has essential role in sensitizing the reader to follow the writer and to promote prediction (Taboada, 2006; Grabe, 2009). Also making students aware of the rhetorical organization of texts reinforces reading fluency and efficiency (Villanueva de Debat, 2012). Manranen (1993) refers to rhetoric as 'persuasive discourse'. She says writers utilize rhetorical

strategies to persuade the readers to follow the information. This task depends on most to the writer's preconception of persuasiveness about form and the content (p. 5). As Jafarian et al. (2014) state rhetoric is engaging upon what, why, how of an expression. Carrell (1982) mentions that textual features such as cohesive devices, discourse markers, rhetorical organization or paragraphing are usual terms that should be take into consideration in teaching reading skills. Text structure consciousness which contains identification and paying attention to discourse signalling system, has been emphasized as an efficient reading strategy. As a result, not being sensitive to organizational system of texts causes comprehension difficulties (William, 2007; Grabe, 2009; Zarrati et al., 2014). Devitt (2009) proposes that 'critical awareness' is the result of 'genre awareness' which can be assumed at the same time as a type of 'rhetorical awareness' (p. 337). In her view, teaching genre awareness in classes allows the students to examine genres, also to engage in learning in an informed way. 'Genre awareness is beyond just being expertise in text type, rather the proficiency of how to act and negotiate in a discourse community' (Erickson & Gustafrson, 2008).

2.2. Signalling

As Coulthard (1994) points out when a writer creates a text, he has no information about the reader, his background knowledge and the content he reads. The only strategy for him is to write for an assumed addressee, taking into account learners' writing skills and proficiencies (Cer, 2019). Widdowson (1983) has the same idea by mentioning that the writer takes a dual role: 'the focal act' of the writer as addresser and 'enabling act' as addressee, or in Halliday's terms as 'ideational and interpersonal' (Hallidy & Hassan, 1976). When we use the world knowledge, we are referring to readers' ability to recognize and use appropriate signaling words (Meyer et al., 2012). Coulthard (1994) further declares that since knowledge is not linear, the writer should organize this non-linear knowledge in a linear order (text). He adds there are several patterns two of which are referred to as: General/ Particular pattern and Problem / Solution pattern. Two main signals of the general/ particular relation are: 'Enumerables' (Tadros, 1994) and 'Matching Relations' (Hoey, 1983, p.113).

Any communication is prediction-based between the addressee and addresser. On one hand, the addresser predicts something to convey and on the other hand, the addressee predicts or expects happening of some goals. A prediction is not fulfilled, unless the 'co-operative principles' or 'Gricean Maxims' Grice (1975) are observed. Building up awareness

about Predictive Categories can help to the observance of 'Gricean Maxims'. Constructing the text on the basis of Predictive Categories helps the writer to be more precise in terms of content and goals. Arranging the information in terms of V member and D member of Predictive Categories is in fact putting the information into the highly systematic framework of 'co-operative principles'. Therefore, the writer can control the *quality*, *quantity*, *manner*, and *relevance* of the information. It is not sufficient to presenting information in the form of a text, rather as Coulthard (1994) mentions, one of the writer's responsibilities is 'signal to the reader the position and/ or discoursal function of distinctive part of the text' (p.7). A writer takes into consideration the nature and value of signals that is who is speaking to whom and who is saying what. As Hyland (2005) mentions that writers employ text organizing signals to produce a text that readers find coherent and convincing. In this regard, signalling words guide the reader to construct a coherent text (Meyer & Ray, 2011).

2.3. Prediction

Prediction related to the category of generative learning strategies (Fiorella & Mayer, 2016; Wittrock, 2010) and its role in improving students' reading skills has been illustrated by Sumirat et al. (2019). In this group prediction possesses some common features with other strategies like pretesting and guessing by which students are engaged in active retrieval process, because students should recall and create a reply normally should conformed by occurrence of the true answer (Brod, 2021). Although predicting and guessing are used synonymous in some articles (e.g., Yan et al., 2014), Brod (2021) proposes that prediction is a learning strategy by itself, it should be set apart from guessing where by guessing learners generate a response to unknown material, but predicting occurs on the basis of some already acquaintance with information; pre-existing semantic associations were recalled (Brod et al., 2018). Therefore, in prediction the students are more self-confident in their answers (Brod, 2021). Also, the critical role of retrieval practice in learning have been emphasized by other scholars (Karpicke & Roediger, 2008; Karpicke et al., 2016). Even incorrect predictions are especially beneficial when they semantically overlap with the correct answer (Cyr & Anderson, 2018, cited in Brod, 2021).

Related attempts that have recently gained speed and strength deals with the relation between guessing and learning. Kornell et al. (2009) argue that testing even during novel reading is useful for memory even though most of the guesses are incorrect, because it triggers great retrieval

effort and promote learning. Kornell et al. (2009)'s findings have been developed and confirmed by other scholars (e.g. Karpicke & Grimaldi, 2012; Grimaldi & Karpicke, 2012; Henson & Gagnepain, 2010; Butowska et al., 2021). Taking into consideration that even incorrect guesses have impacts on learning, the notion of 'surprise' is highlighted. Surprise is a kind of violation of expectations (Stahl & Feigenson, 2018). In a study by Stahl & Feigenson (2017) about children, including infants, the studies reveal that core knowledge and violations of expectations produced by this knowledge form new learning. Also, in another essay reviewing research on retrieval–based learning by Grimaldi & Karpicke (2012), the results show that unsuccessful retrieval attempts can reinforce following encoding and learning.

2.4. Predictive Categories

Six categories of prediction as textual indices have been presented by Tadros (1994) are the main concern of this study: *Enumeration, Advance Labelling, Reporting, Recapitulation, Hypotheticality,* and *Question,* each of these categories consists of two parts. Prediction is signalled by the first part (predictive) which is called 'V member'. The created prediction will be fulfilled by the second part (predicted) referred to as 'D member'. Each of these categories will be discussed respectively:

2.4.1. Enumeration

In Enumeration a discoursal act which is signalled by the writer, put the writer into obligation to 'enumerate'. The created prediction is fulfilled by 'D member'. There are some *'Criteria'* for each type of six Predictive Categories according to which we can recognize and predict the forthcoming information in the text. Three types of Enumeration have been established, each of which is an enough and a satisfactory condition. (Some examples for each one will be presented in the 'Results' part)

Necessary condition needed as V membership of Enumeration:

(1) When a sentence includes either (a) a plural subject followed by a verb which needs a complement followed by a colon, or (b) a free clause followed by a clause binder.

(2) When a sentence contains a cataphoric textual place reference item such as *the following* or *as follows* pairing with *a plural noun*.

(3) When a sentence contains an Enumerable pairing with a numeral, conveys that the presented message is new (p.71).

2.4.2. Advance Labelling

In the category of Advance Labelling the writer commits himself to do a discourse act that is labelized by him. For example, if the writer mentions: 'It is better to make a distinction between X and Y', he is under obligation to show the distinction between X and Y.

Criteria for V membership of Advance Labelling:

Four criteria are given below, all of which must be satisfied to qualify for inclusion:

(1) A labelling of a discoursal act must be inserted in the sentence.

(2) This labelling must likely to happen.

(3) The task of the actor is mentioned nowhere, and, thus, stays as the writer's.

(4) Fulfilment must not occur in the same sentence containing labelling.

Advance Labelling is recognized by (a) linear text, (b) non-linear text, a 'table', 'diagram', 'graph' or the like, or (c) non-linear text followed by linear text (p. 73).

2.4.3. Reporting

In the Reporting category, the writer detaches himself from those expressions that are mentioned by others, not him, by attributing to them. The signal of this detachment creates the prediction that the writer will return to clarify his position toward those expressions.

All the criteria given below must be fulfilled in a sentence as a realization of Reporting:

(1) The sentence must contain at least one Report structure.

(2) The sentence must contain propositional content which is attributed to others.

(3) The writer must detach himself from what he is reporting, i.e. if he says 'As x said' or 'x has rightly pointed out', there is no detachment here from the Report structure.

(4) The position of the reporting clause is significant: If it comes at the end as the only one in the paragraph, it assumed as a comment not reporting.

2.4.4. Recapitulation

The term 'Recapitulation' is used for a member which predicts by retrieving from earlier in the context. For example, 'in the preceding part';

or by the inferential 'then' are some signals of existence of Recapitulation. It informs the occurrence of new message, also, in the V member there is a verb referring to a discourse act and the items like 'already', 'in chapters …', 'so far', etc. which refer to the time or place.

Criteria for V membership of Recapitulation:
   (1) The sentence must include: either (a) a labelized discoursal act or
   (b) the inferential 'then'.
   (2) If (a), the following further criteria apply:
   (i) the labelling must have a past-tense morpheme in the clause predicator;
   (ii) The role of the actor must not be mentioned elsewhere, but stays as the writer's.
   (3) Whether (a) or (b), the sentence must not be paragraph-final, for in that case its function will be that of comment (i.e., reminder of relevance) (p.76).

2.4.5. Hypotheticality

Hypotheticality is similar to Reporting on the basis of the notion of writer detachment, but here the writer disconnected from the real world by creation of a hypothetical world. Each of these characteristics is both a necessary and sufficient condition for V membership of Hypotheticality:

Criteria for V membership of Hypotheticality:
   (1) Where a sentence contains a verb like *assume, suppose, consider* and is subject to the following conditions:
   (i) the verb is either used in the imperative or is preceded by let us;
   (ii) in the case of consider the verb is followed by a nominalization which has no embedded propositional content.
   (2) Where a sentence contains the structure common in mathematics of the setting up of variables: let + NP + be + NP
   (3) Where a sentence contains a fictitious proper name.
   (4) Where a sentence contains 'if + NP + VP (past verb) + NP + VP (past model)'.
   (5) Where a sentence contains 'if + NP + VP (present + verb) + NP + VP (present or past model) (p.77).

2.4.6. Question

Question is based on the underlying assumption of writer detachment from resolution of a proposition posed in the question form by him, and

this detachment creates the prediction that the writer will come again to clarify his position toward that question. All of the characteristics are necessary for existence of V member.

Criteria for V membership of Question:
    (1) The sentence must have interrogative syntax.
    (2) It must occur at section level, not under the heading 'Questions'.
    (3) There must not be more than two interrogative sentences in succession, otherwise there is the impression not now, but later (p. 79).
    Research Question One: How are the Predictive Categories are observable in the content-based materials?
    Research Question Two: What are the possible implications of Predictive Categories for language teachers, student readers and material designers?

3. Method

The data for the present study comprise 10 chapters randomly chosen from 5 books (two chapters from each) by different authors in the field of Civil Engineering. These books were mentioned in the next part (Materials).The approach to analysis data as a qualitative descriptive research was generally explorative. The aim of the author, as an ESP teacher in the field of Civil Engineering, was to explore Predictive Categories in the data drawn from some Civil Engineering text books in order to sensitize students about existence of these Predictive devices and consequently to facilitate students' interaction with the texts in the classroom discourse. To achieve this, a model of discourse analysis that was previously designed by Tadros (1981, 1985, 1994) for an economic textbook was used, as the method of the study. The underlying notion of this model is 'Prediction', which is a certain commitment of the writer to the occurrence of an explicit linguistic event later in the text. Also, surprisingly, a new Predictive Category was also observed in this data that was not discussed before by Tadros or others; can be called **'Overlapping Predictive Categories'**. It seems necessary to mention that it is different from the condition of 'Complex Sequencing' clarified by Tadros (1985), in which Predictive Categories are capable of yielding interesting and at the same time complex sequencing; that is one part of the sample fulfils one Predictive Category and another part satisfies another Predictive Category. In the 'Overlapping Predictive Categories', two or more Predictive Categories **'exactly overlap'** each other.

3.1. Materials

The data examined in this study includes 5 textbooks in the field of Civil Engineering, 2 chapters from each were randomly selected. These books are:

(1) Simplified building design for wind and earthquake forces (Ambrose & Vergan, 1990)
(2) Building and Civil Engineering construction (Boughton, 1983)
(3) Civil Engineering Materials (Jackson & Dhir, 1988)
(4) Welded Joint design (Hicks, 1999)
(5) Stability of Large Structures (Zalka & Armer, 1992)

3.2. Procedure

In this study, after choosing 10 chapters randomly, the data was descriptively analysed in terms of Tadros's (1994) six types of Predictive Categories. No effort was made for accessing quantitative results, but concentration remained on finding these categories in Civil Engineering texts and discussing their fulfilment on the basis of meeting the mentioned Criteria.

4. Results

Once the research data were collected, the next phase of the research was to analyse these data. The Result part was sub-divided into three parts. In the first part, each Predictive Category was analysed by presenting one example. In the second part 'Complex Sequencing' condition indicated by offering two examples in which one part of the example fulfills one Predictive Category and another part satisfies another Predictive Category. 'Complex Sequencing' is different from those examples in which V members of two or more Predictive Categories are exactly

Overlapping each other. This new type was introduced in the third part by offering six examples were extracted from the data.

4.1. Examples and Discussions of six Predictive Categories

Although necessary 'criteria' for each Predictive Category presented in the 'Review of Literature' part according to which we can predict the forthcoming information, a brief definition of each category is given below, each followed by an example taken from the data.

4.1.1. Enumeration

In Enumeration a discoursal act which is signalled by the writer put the writer into obligation to 'enumerate'. The created prediction is fulfilled

by 'D member'.

Example 1: Type (a) Enumeration: This is isolated on criterion 1.
Some of the major effects are:

(a) *Cut: This actually cuts back part of the slope and reduces the level of the site locally.*
(b) *Cut and fill: These cuts back part of the slope and fills the adjacent area below to a balanced level.*
(c) *Fill: This builds up part of the ground to form a level area part-way the slope* (Ambrose & Vergan, 1990, p. 19).

In this example, the Enumeration is signalled by the colon *'(:)'* following a structure with a plural subject *'effects'* and a verb that demands a complement *'are'*. The sentence *'some of the major effects are'* as the V member of Enumeration creates the prediction that the writer has to mention more than two effects. Prediction is fulfilled by D member in which the writer performs the promised action. He uses the device of *'numbering'* in order to help the reader to distinguish the *'effects'* easily.

4.1.2. Advance Labelling

Advance Labelling is a category of prediction in which the writer attempts to do a discoursal act which was labelled before. Let us consider on example to clarify type (a) Advance Labelling in which prediction is fulfilled by a linear text.

Example 2: Type (a)Advance Labelling
It is useful to reconsider some commonly held ideas pertaining to the behaviour of structures under load.
Firstly, take the relationship between the properties of a structure ...
Secondly, another important property of buildings ...

(Zalka & Armer, 1992, pp. 14-15).

By mentioning the *"It is useful to reconsider some commonly held ideas…"* the writer commits himself to perform the discoursal act '*to reconsider'* which is previously labelled. This created prediction is fulfilled in D member which is a linear text in type (a) Advance Labelling. This example, at the same time, fulfils the necessary criteria of Enumeration, which will be discussed under the heading '*Overlapping Predictive Categories'*.

Example 3: Type (b) Advance Labelling
In the type (b) Advance Labelling, the Prediction created by V member is fulfilled by non-linear text (e.g., figure). Consider the example:
'Typical load-extension curves for mild steel and copper are shown in the figure below.'
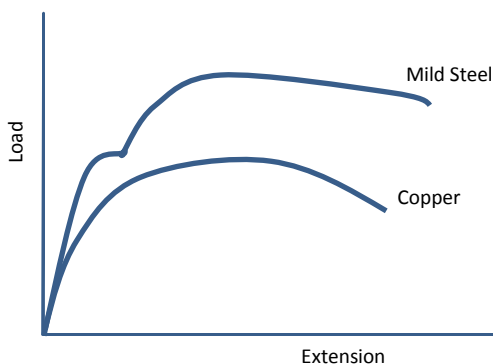
Figure 1. Load-extension curves for mild steel and copper
(Jackson & Dhir, 1988, p. 11)

The writer is obliged to show the promised act by V member. Here, the role is performed by the graph (Figure 1).

Example 4: Type (c) Advance Labelling

In type (c) Advance Labelling, D member including a non-linear text followed by a linear text, fulfils the created prediction in V member. The case is demonstrated in this example:

Readers familiar with mechanical testing will notice that their experience would lead to an expectation of all three lines being combined to form a typical experimental line such as that shown in figure 2.
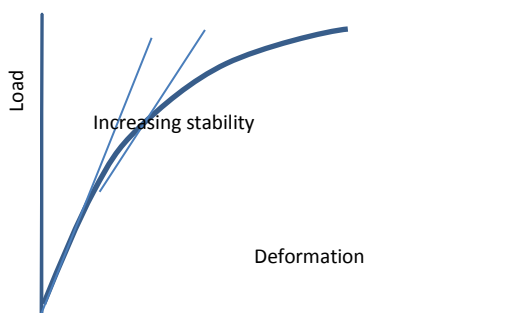

Figure 2. The range of simple load-deformation characteristics

The two outside graphs in figure 2, that is, one curving towards the L-axis and curving towards the D-axis, both represent situations where the size of the structural response is dependent upon the existing load level (Zalka & Armer, 1992, pp. 19-20).

In this example the created prediction is fulfilled by *non-linear text* followed by *linear text.*

4.1.3. Reporting

This category is detachment of the writer from the embedded prepositions by attributing to others.

Example 5: Reporting

The particular form of words was used by Renton in his discussion on the stability of frames [Chilver,1967]. He further refined it for mathematical interpretation, by saying that a system is stable where 'finite changes in it are not produced by infinitesimal perturbations.

<div align="right">(Zalka & Armer, 1992, p. 3)</div>

In the V member, the writer is not presenting his own view, rather the sentence is attributed to Chilver (1967) and his proposition is quoted. The D member fulfils the prediction.

4.1.4. Recapitulation

Recapitulation refers to a member which predicts by recalling information from earlier in the text.

Example 6: Recapitulation

'The three lattice structures described are the principal lattices occurring in the common metals. More complex lattice structures with a lower density of packing occur in some intermetallic compounds and in some of metals…'

<div align="right">(Jackson & Dhir, 1998, p. 7)</div>

The first criterion is that the sentence must include either (a) a discoursal labelling or (b) the inferential '*then*'. In the above example, the discoursal act of *'description'* is labelled. So, it fulfils the criterion (1). According to the second criterion, the existence of past tense morpheme is obligatory in the V member and also the role of the actor must remain as the writer's. The past tense morpheme realized by the writer is *'described'*. The third criterion is that the sentence must not be paragraph final. All these criterions satisfy the criteria for Recapitulation. Therefore, it can be considered as V member for Recapitulation category. The prediction is also fulfilled by the D member straightaway.

4.1.5. Hypotheticality

Hypotheticality is a category of prediction based on the notion of authorial detachment, but here the writer performs this detachment by creating a hypothetical world. No sample for the Predictive Category of Hypotheticality was found in this data. (For related examples see Tadros, 1994).

4.1.6. Question

Question is a Predictive Category based on the underlying assumption of writer's detachment. This detachment creates the prediction that the writer will come again to clarify his position toward that question.

Example 7: The following example illustrates Question:

'*How do we then apply the tensile test figures?*
We ought to know what governs elastic breakdown …'

(Hick, 1999, p.11)

In this category, the V member is a question. The created prediction about this question is fulfilled in D member.

4.2. Complex Sequencing

'Complex Sequencing' refers to the condition in which samples represent multiple predictions (Tadros, 1994). Two illustrations of the way Predictive Categories are interrelated are presented here. In such examples one part of the example fulfils one Predictive Category and another part satisfies another Predictive Category.

Example 1: Question preceding Enumeration

How do we then apply the tensile test Figures? We ought to know … elastic theory become invalid. Several theories as to when elastic break down occurs have been advanced such as when:

  a) *the **greatest principle stress** reaches a certain value…*
  b) *the **greatest principle strain** reaches a certain value…*

(Hick, 1999, p. 11)

The first sentence of the example fulfils the criteria of V membership of the category of Question for which the rest of example is considered as D member. Also, in the sentence '*several theories as to when elastic break down occurs have been advanced such as when*', there is inexact numeral '*several*' in association with enumerable '*theories*'. Therefore, the condition is in accord with the category of Enumeration type (c). Furthermore, the same sentence, includes a free clause and the clause binder '*when*'. In this regard, it enjoys the category of Enumeration type (a), too. The rest of the example is considered as D member. Therefore, the category of Question precedes the category Enumeration.

Example 2: Question preceding Advance Labelling

'*What are the similarities between the platform and pressure vessel?*
They can be summarized as:
  -*material thickness and generic type*
  -*joint details… .*'

(Hick, 1999, p. 22)

Considering the first sentence as the V member of the category Question, the rest of the example fulfils the created prediction as D member. Furthermore, the writer commits himself to *summarize* the promised presentation of *similarities between the plant form and pressure vessel*. So, the example is considered type(a) of Advance Labelling. Therefore, in the above example the category of Question precedes Advance Labelling.

4.3. *Overlapping Predictive Categories (new category)*

The present part introduces a new Predictive Category that has not been discussed by Tadros or any other researcher. It is also different from *Complex Sequencing*. As it was discussed in the Complex Sequencing, two or three Predictive Categories are placed *beside* each other, but in 'Overlapping' Predictive Categories two or three Predictive Categories are exactly *overlapping* each other. In such condition, *the same structure fulfils the necessary criteria of two or three Predictive Categories simultaneously.* Three illustrations are presented as follows:

Example 1: Overlapping Advance Labelling, Enumeration and Question

Consider the stability of any structure comprised of an assembly of prescribed constituent elements, there are two pertinent questions, which can be posed on the basis of such limited information. Firstly, does the arrangement of the elements affect its stability? Secondly, is there a limit to the number of elements arranged in a particular manner which is naturally stable? Figure 1 shows the results of some simple experiments. Figure 1/a is a wall like structure built with model clay bricks in stretcher bond and fourteen courses high. This model was subjected to a disturbance which caused a collapse leaving just three courses intact (Fig.1/b) Figures 1/c and 2/e illustrate two tower structures, the first with a triangular arrangement of bricks and 51 courses high.
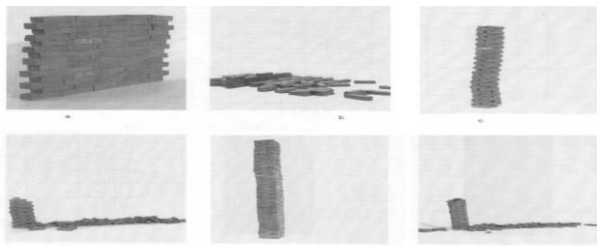

Figure 3. Demonstration of the effect of the arrangement of units on the size of the stable structure (Zalka &Armer, 1992, pp. 7-8)

The above example is one of the cases in which three Predictive Categories occurred simultaneously: Enumeration, advance Labelling and Question. Here, the verb *'consider'* as a prospective discoursal act, is labelled deliberately. By these characteristics, the above example is considered as a sample of type (b) Advance Labelling, by which the figure fulfils the created prediction. At the same time, by examining the example it becomes clear that the exact numeral *'two'* in association with the enumerable *'question'* gives the possibility of being known as the Enumeration category to the structure. Using the sequential markers *'firstly'* and *'secondly'*, the writer helps the reader to distinguish the D member easily. Therefore, you can see that the presented example contains the criteria of two Predictive Categories of Advance Labelling and Enumeration at the same time. Furthermore, parts of D member of Enumeration, which are distinguished by sequential markers of *'firstly'* and *'secondly',* are V member of the Predictive Category of 'Question'. The answers to these questions as the D members follow straightaway. Consequently, the example under discussion includes three mentioned Predictive Categories *overlap* each other.

Example 2: Overlapping Enumeration and Advance Labelling

Before discussing deformation characteristics further, it is useful to reconsider some commonly held ideas pertaining to the behavior of structures under load. Firstly, take the relationship between the properties of a structure and the properties of the materials from which it is made.….

Secondly, another important property of buildings which is of special interest to the designer is its ductility ...

<div align="right">(Zalka & Armer, 1992, 14-15)</div>

The writer by the sentence *'it is useful to reconsider…'* commits himself to do the mentioned 'prospective' discoursal act. Also, the role of the writer is not assigned anywhere, so it remains as the writer's. These are the characteristics of the V member of the category of Advance Labelling. The created prediction is fulfilled by the rest of example as the D member. At the same time, the inexact numeral *'some'* in association with the enumerable *'ideas'* are in accord with the criterion of the category of Enumeration. The D member of the category of Enumeration fulfils the created prediction immediately. As a result, as the example under discussion shows the V member and also the D member of two Predictive Categories of Advance Labelling and Enumeration are exactly *overlapping* each other.

Example 3: Overlapping Recapitulation and Advance Labelling

'Examples of the three varieties of foundation/ground floor construction discussed in preceding paragraphs are shown in fig 2.
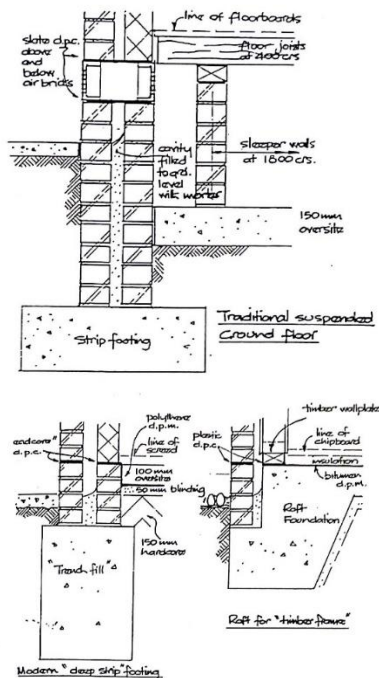

Figure 4. Foundation and Ground floor details showing d.p.c' (Boughton, 1983, p. 31)

This example fulfils both criteria of Advance Labelling and Recapitulation at the same time. The reasons are given as follows:

The discourse act of showing is labelled in V member and labelling is prospective. Therefore, it is an example of type (b) of Advance Labelling. The prediction is fulfilled by referring to the figure 2. It also fulfils the necessary criterion for the Recapitulation. First of all, the discourse act of *'showing'* is labelled in the V member. The sentence includes a past tense morpheme *'discussed'* which refers to the previous information. The created prediction is fulfilled by referring to the figure 2.

Example 4: Overlapping Advance Labelling and Enumeration

The effects of wind on stationary objects in its path can be generalized as in the following discussions (see fig. 3)

The effects of wind on stationary objects in its path can be generalized as in the following discussions (see Fig. 1.2).

Direct Positive Pressure

Surfaces facing the wind and perpendicular to its path receive a direct impact effect from the moving mass of air, which generally produces the major portion of force on the object unless it is highly streamlined in form.

Aerodynamic Drag

Because the wind does not stop upon striking the object but flows around it like a liquid, there is a drag effect on surfaces that are parallel to the direction of the wind. These surfaces may also have inward or outward pressures exerted on them, but it is the drag effect that adds to the general force on the object in the direction of the wind path.

Negative Pressure

On the leeward side of the object (opposite from the wind direction) there is usually a suction effect, consisting of pressure outward on the surface of the object. By comparison to the direction of pressure on the windward side, this is called *negative pressure*.
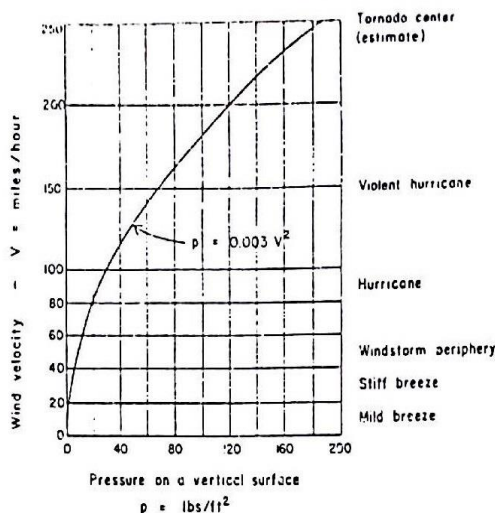

Figure 5. Relation of wind velocity to pressure on stationary object. (Ambrose, 1990, PP. 6-8)

The example includes the 'cataphoric textual place reference item' '*the following*' in association with the plural noun '*discussions*. Therefore, it satisfies the criterion (2) of the Predictive Category of Enumeration. Also, the writer at the same time invites the reader to '*see fig.5*'. Therefore, the example fulfils both the criteria of Enumeration and Advance Labelling about V membership simultaneously. The created predictions are fulfilled

by D member straightaway. As a result, in this example, two Predictive Categories overlap each other.

Example 5: Overlapping Advance Labelling and Enumeration

There is then a condition in which the stress system is three dimensional and the strain system is two dimensional, see Fig. 1.11. Where

$$\varepsilon_x = \sigma_x/E - v\sigma_y/E - v\sigma_z/E \quad \text{or} \quad E\varepsilon_x = \sigma_x - v(\sigma_y + \sigma_z) \qquad [1.11]$$

$$\varepsilon_y = \sigma_y/E - v\sigma_x/E - v\sigma_z/E \quad \text{or} \quad E\varepsilon_y = \sigma_y - v(\sigma_x + v\sigma_z) \qquad [1.12]$$

$$\varepsilon_z = 0 = \sigma_z/E - v\sigma_y/E - v\sigma_x/E \text{ or } E\varepsilon_z = 0 = \sigma_z - v(\sigma_y + v\sigma_x) \quad [1.13]$$

From the latter we see that

$$\sigma_z = v(\sigma_x + \sigma_y) \qquad\qquad\qquad [1.14]$$

Figure 1.12 is a Mohr's circle constructed for a three dimensional stress system. Each of the circles represents the stress on a section through one of
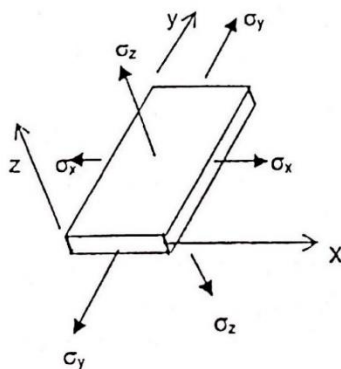

Figure 6. Plane strain condition (Hicks, 1999, p.8)

The example contains a free clause followed by the clause binder *'where'*. Therefore, it is in accord with the criterion (1:b) of Enumeration. The rest of the example is considered as D members of this category. But at the same time the writer invites the reader to '*see fig. 1.11*'. Therefore, the presented example is considered as a sample for the category of Advance Labelling, too.

Example 6: Overlapping Advance Labelling and Enumeration

And the differences from the pressure vessel can be summarized as follows:

- *There is no hole in the chord at the braces.*
- *Large axial and bending loads in braces.*
- *No significant internal pressure loads.*
- *Complex load history.*

- *Little scope for intensive routine inspection and maintenance.*
- *No scope for proof loading.*

(Hicks, 1999, p. 22)

The example, on the one hand, fulfils the criterion number (2) of Enumeration: The V member contains cataphoric textual place reference item '*as follows*' in association with the plural noun '*differences*'. Therefore, it creates the prediction that the differences from the pressure vessel will be '*summarized*'. D member satisfies this prediction. On the other hand, there is the labelling of an act of discourse which is '*summarized*', when the writer commits himself to perform it. The act is also prospective. Therefore, the example meets all of the necessary criteria for the category of Advance Labelling. The realisation of Advance Labelling in the form of 'linear text' shows that it belongs to type (a) of Advance Labelling. In this example both Advance Labelling and Enumeration overlap each other.

5. Discussion and Implications

This study has shown that the model of discourse analysis originally designed for the economic textbooks and later confirmed for a legal textbook by Tadros (1981, 1989), is also successfully applicable and transferable to the analysis the Civil Engineering texts, as well. Regarding the research questions, some implications can be elicited on the basis of the results of our analysis for material designers, language teachers and student readers. The inclusion of '*Predictive Categories*' in material and syllabus designing can be a fruitful way of sensitizing students to the '*rhetorical functions*' of these categories (Thurstun & Candlin 1998, p. 268). 'Every part of a text has a role to play, a function to fulfil, with respect to the other part of text' (Tboada, 2006). As Tadros (1994) maintains a text without a signal of prediction cannot clearly commit the writer to do a specific act of discourse. Reading comprehension is a cognitive process and it occurs as the result of the balance between the background knowledge (schemata), on the one hand, and textual features (such as Predictive Categories), on the other hand. It is recommended for language teachers to capitalize on the '*Predictive Categories*' in the ESP texts and in so doing activate the related schemata in the mind of the language learners. It is argued that predicting the following syntactical structures and lexical items within a discourse encompasses and involves deeper processing on the part of language learners. Deeper processing of reading materials will of course lead to long-term learning and retention (Brod, 2021).

5.1. *Implication for Student Readers*

According to to Gimênez (1996) and Boyle (1994) ESP courses are usually of short duration. The trained student by 'Predictive Categories', reads ' selectively' according to his need/s, in order to fulfil the created prediction. Students who are aware of the 'Predictive Categories' can decrease the 'false hypothesis' by replacing true expectations about what is coming next. In this way, it prevents the tendency to maintain a hypothesis in the face of disconfirming evidence, a phenomenon refers to as 'confirmation bias' (Marsall & Gilmour, 1993).

5.2. *Implication for Material Designers:*

The inclusion of 'Predictive Categories' in material and syllabus designing can prove a fruitful way of sensitizing students to the 'rhetorical functions' of these categories (Thurston & candling, 1998, p. 268). As swales (1990, p. 74) argues making awareness about the structure of a text is crucial as it has been indicated for grammar. Material designer must be aware that for readers identification of textual signals are extremely important. This identification of different interactions concurred is what Ducrot (1985) quoted in Harvey (1992, p.118) calls it as the 'Voices of Discourse'. Flowerdew (2013) who elaborates Gricean Maxims, points out that sometimes there is a failure to fulfil the maxims. He discusses this within the notion of 'infringing' (p.100). Building up awareness about Predictive Categories can help to the observance of 'co-operative principles' or 'Gricean's Maxims' Grice (1975).

5.3. *Implication for Teachers:*

'Learning' does not occur unless engaging the learner in 'doing' appropriate tasks (Widdowson, 1979, 1983, 1990; Kasper, 1995; Hyland & Hyland, 1992). There are many ways through which the ESP teachers can assist the 'awareness-building' and 'consciousness- raising' of the students relating to 'Predictive Categories'.

6. Conclusion

Most ESP students, because of the limitation of linguistic knowledge compare to General English students need more signalling devices to achieve their required scientific and technological information in their discipline. In classroom discourse, material designers, teachers and students create a triangular in which the teacher as a *catalyst* facilitates the process of learning. Meanwhile, highlighting Predictive Categories as

a rhetorical device to enhance reading comprehension abilities is suggested.

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References

Amer, A. A. (1994). The effect of knowledge- map and underlying training on the reading comprehension of scientific texts. *English for Specific Purposes*, *13*, 33-45.

Boyle, R. (1994). ESP and distance learning. *English for Specific Purposes*, *13*(2), 115-128.

Brod, G. (2021). Predicting as a learning strategy. *Psychonomic Bulletin and Review, 28*, 1839-1847.

Brod, G., Hasselhorn. M., & Bunge. S. A. (2018). when generating a prediction boosts learning: the element of surprise. *Learning and Instruction, 55*, 22-31.

Butowska, E., Hanczakowski, M., & Zawadzka, K. (2021). You won't guess that: on the limited benefits of guessing when learning a foreign language. *Memory and Cognition, 15*, 1-15.

Carrell, P. L. (1982). Cohesion Is Not Coherence. *TESOL Quarterly*, *16*(4), 479–488.

Cook, G. (1989). *Discourse*. Oxford University Press.

Coulthard, M. (1994). *Advances in Written Text Analysis*. Routledge.

Coulthard, M. (1994). On analysing and evaluating written text. In M. Coulthard (Ed.), *Advances in Written Text Analysis*. (pp. 1-11). Routledge.

Cyr, A. A., & Anderson, N. D. (2018). Learning from our mistakes: Effects of Learning errors on meaning in healthy younger and older adults. In C. Haslam & R. P. C. Kessels (Eds.), Errorless Learning in neuropsychological rehabilitation: *Mechanisms, efficiency and application* (pp.151-163). Routledge/Taylor & Francis Group.

Cer, Erkan. (2019). The Instruction of Writing Strategies: The Effect of the Metacognitive Strategy on the Writing Skills of Pupils in Secondary Education. SAGE Open. 9. 215824401984268. 10.1177/2158244019842681.

Devitt, A. J. (2004). *Writing Genres*. Southern Illinois University Press.

Devitt, A. (2009). Teaching critical genre awareness. In C. Bazerman, A. Bonini, & D. Figueiredo (Eds.), *Genre in a Changing World* (pp. 337-351). West Lafayette, IN: Parlor Press.

Ducrot, O. (1985). *Le Dire et al Dit.* Editions de Minuit.

Fiorella, L., & Mayer, R. E. (2016). Eight ways to promote generative learning. *Educational psychology Review, 28*(4), 717-741.

Flowerdew, J. (2013). *Discourse in English Language Education*. Routledge.

Francis, G. (1994). Labelling discourse: An aspect of nominal-group Lexical Cohesion. In M. Coulthard (Ed.), Advances in Written Text Analysis (pp. 83-101). Routledge.

Gimênez, J. C. (1996). Research and discussion note. Process assessment in ESP: input, throughput and output. *English for Specific Purposes, 15*(3), 233-241.

Grabe, W. (2009). *Reading in a second language moving from theory to practice*. Cambridge University Press.

Grice, H. P. (1975). Logic and Conversation. In P. Cole, & J. Morgan (Eds.), *Syntax and Semantics* (pp. 44-58). Academic Press.

Grimaldi, P.J., & Karpicke, J. D. (2012). When and why do retrieval attempts enhance subsequent encoding? *Memory & Cognition, 40*, 505-513.

Halliday, M. A. K., & Hasan, R. (1976). *Cohesion in English*. Longman.

Harvey, A. (1992). Science reports and indexicality. *English for Specific Purposes*, *11*. 115-128.

Hayati, A. M. (2008). Teaching English for Special Purposes in Iran: Problems and suggestions. *Arts and Humanities in Higher Education*,7, 149-165.

Henson, R.N., & Gagnepain, P. (2010). Predictive, interactive multiple memory system. *Hippocampus, 20* (11), 1315-1326.

Hoey, M. (1983). *On The Surface of Discourse*. George Allen & Unwin.

Hyland, K. (2005). *Metadiscourse: Exploring interaction in writing*. Continuum. London. New York

Hyland, K., & Hyland, F. (1992). Go for gold: Integrating process and product in ESP. *English for Specific Purposes*, *11*, 225-242.

Jafari, S. M., & Shokrpour, N. (2012). The reading strategies used by Iranian ESP students to comprehend authentic expository texts in English. *International Journal of Applied Linguistics and English Literature, 1*(4), 102-113.

Jafarian, T., Azizfar, A., Jamalinesari, A., & Gowhary, H. (2014). Investigating the extent of familiarity of Iranian ESP teachers and ESP course learners with academic rhetoric within a systemic functional grammar based their educational level, age and gender. *Procedia-Social and Behavioral Sciences, 192*, 213-219.

Karpicke, J. D., & Roediger, H. L. III. (2008). The critical importance of retrieval for learning. *Science*, 319, 966-968.

Karpicke, J. D., & Grimaldi, P. J. (2012). Retrieval- based learning: A perspective for enhancing meaningful learning. *Educational Psychology Review, 24*(3), 401-418.

Karpicke, J. D., Blunt, J. R., & Smith, M. A. (2016). Retrieval-based learning: Positive effects of retrieval practice in elementary school children. *Frontiers in Psychology* ,7, 350.

Kashef, S. H., Pandian, A., & Modir Khameneh, S. (2014). Toward a Learning- centered EAP Instruction: An Attempt to Change Students' Reading Attitude. *Theory and Practice in Language Studies, 4*(1), 39-45.

Kasper, L. F. (1995). Theory and Practice in content-based ESL reading instruction. *English for Specific Purposes, 14*(3), 223-230.

Kornell, N., Hays, M. J., & Bjork, R. A. (2009). Unsuccessful retrieval attempts enhance subsequent learning. *Journal of Experimental Psychology: Learning, Memory & Cognition, 35*, 989-998.

Marshall, S., & Gilmour, M. (1993). Lexical Knowledge and reading comprehension in Papua New Guinea. *English for Specific Purposes*, *12*, 69-81.

Mauranen, A. (1993). Contrastive ESP rhetoric: Metatext in Finnish – English Economics texts. *English for Specific Purposes, 12*, 3-22.

Meyer, B. J. F., & Ray, M. N. (2011). Structure strategy interventions: Increasing reading comprehension of expository text. *International Electronic Journal of Elementary Education*, *4*(1), 127-152.

Meyer, B. J. F., Ray, M. N., & Middlemiss, W. (2012). Children's use of comparative text signals: The relationship between age and comprehension ability. *Discours*.

Modirkhameneh, S., & Kashef, M. H. (2009). ESP Instruction: Traditional vs. Eclectic method on relation to reading comprehension of Iranian agriculture students. *The Journal of Applied Linguistics*, *2*(1), 159-193.

Mostafaei, M., & Ershadi, A. R. (2016). ESP Program in Iran: A Stakeholder- based Evaluation of the Program's Goal, Methodology, and Textbook. *Issues in Language Teaching (ILT)*, *5*(2), 279-306.

Nezakatgoo, B., & Behzadpoor, F. (2017). Challenges in teaching ESP at medical universities of Iran from ESP stakeholders' perspectives. *Iranian Journal of Applied Language Studies*, *9*(2), 59-82.

Stahl, A. E., & Feigenson, L. (2017). Expectancy violations promote learning in young children. *Cognition*, *163*, 1-14.

Stahl, A. E., & Feigenson, L. (2018). Violations of core knowledge shape early learning. *Topics Cognitive Science*, *11*, 136-153.

Stapp, Y. F. (1998). Instructor – employer collaboration: A model for technical workplace English. *English for specific Purposes* 17(2), 169-182.

Sumirat, R., Padilah, C. F., & Haryudin, A. (2019). The use of Predictions Strategy in Improving Students' Reading Comprehension. *PROJECT (Professional Journal of English Education), 2*(4), 521-525.

Swales, J. M. (1990). *Genre Analysis.* Cambridge University Press.

Swales, J. M. (1993). The paradox of value: Six treatment in search of the reader. In W. Henderson, T. Dudley-Evans, & R. Backhouse (Eds.), *Economics and Language* (pp. 223-239). Routledge.

Swales, J. M. (1995). The role of textbook in EAP writing research. *English for specific Purposes, 14*(1), 3-18.

Taboada, M. (2006). Discourse markers as signals (or not) rhetorical relations. *Journal of Pragmatics, 38*, 567-592.

Tadros, A. A. (1981). *Linguistic prediction in Economics text*. PhD diss., University of Birmingham.

Tadros, A. A. (1985). *Prediction in Text*. The University of Birmingham, English Language Research.

Tadros, A. A. (1989). Predictive Categories in University Textbooks. *English for Specific Purposes, 8*, 17-31.

Tadros, A. (1994). Predictive Categories in expository text. In M. Coulthard (Ed.), *Advances in Written Text Analysis* (pp. 69-81). Routledge.

Thurstun, J., & Candlin, Ch. N. (1998). Concordancing and the teaching of the vocabulary of academic English. *English for Specific Purposes, 17*(3), 267-280.

Villanueva de Debat, E. (2012). Applying current approaches to the teaching of reading. Online, Available in: http://www.scribd.com/doc/98645273/Applying-Current-Approaches-to-the-Teachingb -of-Reading.

Widdowson, H. G. (1979). *Explorations in Applied Linguistics*. Oxford University Press.

Widdowson, H. G. (1983). *Learning Purpose and Language Use*. Oxford University Press.

Widdowson, H. G. (1990). *Aspects of Language Teaching*. Oxford University Press.

Widdowson, H. G. (1998). Communication and community: The pragmatics of ESP. *English for specific Purposes, 17*(1), 3-14.

Williams, J. P. (2007). Literature in the curriculum: integrating text structure and content area instruction. In D. S. McNamara (Ed.), *Reading comprehension strategies theories, interventions, and technologies* (pp. 199-220). Psychology Press.

Wittrock, M. C. (2010). Learning as a generative process. *Educational Psychologist, 45*(1), 40-45.

Yan, V. X., Yu, Y., Garcia, M. A., & Bjork, R. A. (2014). Why does guessing in correctly enhance rather than impair, retention? *Memory & Cognition, 42*(8), 1373-1383.

Zarrati, Z., Nambiar, R. M., & Maasum, T. N. R. T. M. (2014). The importance of text structure awareness in promoting strategic reading among EFL Readers. *Procedia- Social and Behavioral Sciences, 118*, 537-544.

References (Data)

Ambrose, J., & Vergan, D. (Eds.). (1990). *Simplified Building Design for Wind and Earthquake Forces*. John Wiley & Sons, Inc. P.19

Boughton, B. W. (1983). *Building and Civil Engineering Construction*. Granada.

Hicks, J. (Ed.). (1999). *Welded Joint design*. Alington Publishing Limited.

Jakson, N., & Dhir, R. K. (Eds.). (1988). *Civil Engineering Materials*. Mackmilan Education Ltd.

Zalka, K. A., & Armer, G. S. T. (1992). *Stability of Large Structures*. Butter worth-Heinemann Ltd.