

Use of Graphic Representations in an ESP Course

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Many researches have suggested inclusion of text structure awareness in courses on reading scientific English on the grounds of its usefulness to improve reading comprehension and recall. The use of adequate graphic representations to illustrate the particular discourse types found in science and technology help students see how parts in the whole relate, how they can summarize and synthesize complex ideas, and how grammar functions as discourse indicator, among other cognitive and metacognitive skills we teachers aim at.

In this paper I will show how we work with texts in a first level reading course and will illustrate in particular the instruction our students receive in drawing discourse-related charts when dealing with the language of definition, classification, partition and description.

1. Introduction

In this article, I'll briefly describe one technique that proved to be useful in the handling of analysis of scientific discourse in an ESP course for students of Engineering. I'm referring to the use of graphic representations as a reading skill development activity. These students constitute a heterogeneous group as to their linguistic level in English and as to their capacity to follow the "thread of thought" in scientific texts. In a very short time, only two semesters, we try our best to tailor-make a course that aims at developing the ability to read effectively, without resorting to word-by-word translation.

For some years now, the presentation of the language atomized in grammatical or functional aspects has been replaced by a discourse analysis approach. Vocabulary and syntax are presented as a combination to "realized rhetorical routines," in Widdowson's words. Readers of scientific texts are people whose minds are directed towards rational thought in a problem-solving line. Thus, the kind of activities that have been favoured are those that engage students in mental activities similar to the ones they will be using in their future. In this teaching-learning context, the interaction of different kinds of reading-skills oriented activities play an important role specially those that have to do with text-structure awareness. And the use of any form of diagrammatic display to illustrate them has been recommended by many specialists in the field.

2. Use of graphic representations

Apart from the general oriented goal of preparing students for the kind of prose they will be concerned with in the future, this activity (a) aids students in seeing the relation parts-to-whole, (b) helps students summarize and synthesize complex ideas, (c) shows students how grammar functions as discourse indicator, (d) prepares them to read different drawings later on, and (e) trains students in transferring a line of thought into a form of drawing, avoiding word-by-word decodification. Let's not forget this activity forces the working with whole chunks of meaning.

Types of illustrations

As we know, a great deal of technical information in Engineering textbooks is presented in non-verbal modes, each one serving a different purpose and making use of particular rhetorical-syntactical patterns. Thus, for example, and to mention only a few:

Graphs: give numerical details; show relationship between variables.

Flow charts: show stages of a process or procedure.

Schematic drawings: provide with physical description; give spatial relationship of the parts of an object, or the position of different pieces.

Tables: compare different sort of information.

Each field of scientific study makes use of different illustrations to suit its needs.

3. How to use illustrations in class

The first level course is somehow preparatory for a second reading course where "authentic" material constitutes the core of instruction. The kind of low linguistic level texts used in this course generally illustrates the rhetoric of classifications, definitions, instructions and descriptions.

Here the teacher assists in identifying text structure and choosing a particular illustration for it. An example:

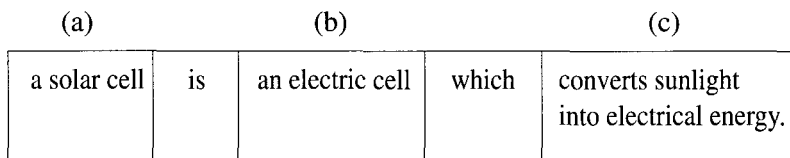
In the case of the presentation of Definitions and how the grammatical elements associated with them are presented, the following procedure is suggested:

1. The teacher can work with pre-reading activities that prepare students for the actual content and organizational pattern students are likely to find in a text that includes simple or complex definition. For example this one:

Television is a telecommunication system which simultaneously transmits both visual and audioinformation. This information is reproduced at a receiver. All TV methods consist of the following basic elements: (1) pickup devices that convert the visual and aural information into electrical signals (2) elements for transmitting the electrical signals, and (3) reproducing devices which reconvert the electrical signals into image and sound.

Pickup devices include microphones and cameras which convert the optical image into electrical signals. Transmitting devices include modulators and high power transmitters: they convert the signals which are generated in the pickup devices into high frequency signals. These HF signals are propagated through transmission lines or through the free space. Relay systems receive and retransmit these signals. A TV satellite is an example of a relay system. The reproducing device is usually a TV receiver that converts the received electrical signals into images and sound. The images are displayed on the screen of a cathode ray tube and the sound comes through a loudspeaker.

2. Students draw some kind of illustration that shows the rhetorical organization of the text. In this case, block diagrams are suggested as in textbooks they can show steps in a process or parts of a whole. Thus, the illustration for a definition would be:



Notice that what is being isolated in blocks are key concepts, in this case (a) the term being defined, (b) the class to which (a) belongs, and (c) characteristics, composition, uses of (a), how (a) works, where it is found, used, what it resembles, etc.

Arrows or lines that join boxes stand for cohesive devices.

The passages having definitions as main rhetorical function are used to show beginning students one function of passive voice, defining relative clauses with or without relative word, and the use of the -ing form in the shortened version.

3. Now the students are ready to work on their own. The sort of activities suggested in this case can be taken from this listing:

A. Identify (a), (b), and (c) parts in the following passages:

A relay is a switching device for opening and closing one or more electrical circuits on receipt of an electrical signal.

A centre lathe

A lathe is a machine tool which is used to produce work which is circular in cross-section by rotating the work against a cutting tool. In other words, it generates a surface of revolution. The finished work may be cylindrical or tapered (i.e. cone-shaped). In addition to generating cylindrical surfaces, lathes can generate plane surfaces by facing. The lathe may also be used for boring and cutting screw threads.

Transistors are basically current control devices and can be used as switchers and amplifiers. Modern transistors fall into two main classes: bipolar devices, also called junction transistors and unipolar transistors, usually known as F.E.T.s (field-effect transistors).

Friction is a word describing the opposing forces that occur when one surface passes against another surface. A car moving along encounters the frictional force of the wind; the tires encounter the resistance of the road.

B. Isolate (c) parts in the following sentences. Group them according to what they have in common:

1. Riveting is a method of joining metals permanently.

2. Elements are chemical substances that cannot be broken down into anything simpler by chemical means.
 3. A neutron is a particle having the same mass as a proton, but carrying no electrical charge.
 4. A relay is a switching device for opening and closing one or more electrical circuits on receipt of an electrical signal.
- C. Match from an (a), a (b), and a (c) listing and write definitions.
- D. Determine which words or phrases from a list belong to (a), (b) or (c).
- E. Write definitions of your own.

Students should not be overloaded with many skills of the same sort. Teachers should not forget that this is just one of the many reading activities to be utilized in class. Besides, students of science should not feel their time is being deviated from the kind of texts they are motivated to read, like the one which follows:

Planing and planers

Planing is a relatively simple cutting process by which flat surfaces, as well as various cross-sections with grooves and notches, are produced along the length of the workpiece. Planing is usually done on large workpieces- as large as 25 m x 15 m (75 ft x 40 ft)

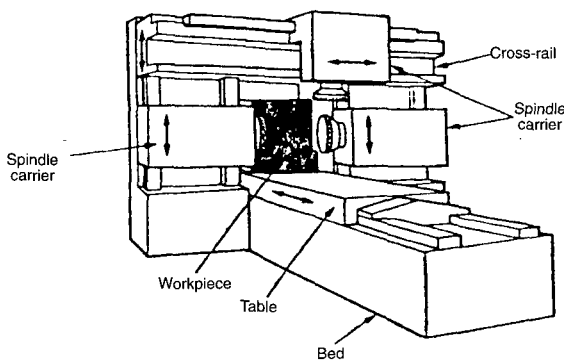


Figure 1: Schematic illustration of a triplex milling machine. Note the vertical-spindle cutter and two horizontal-spindle cutters. *Source:* ASM International.

In a planer (Fig. 2), the workpiece is mounted on a table that travels along a straight path. A horizontal cross-rail, which can be moved vertically along the ways in the column, is equipped with one or more tool heads. The cutting tools are attached to the heads, and machining is done along a straight path. Because of the reciprocating motion of the workpiece, elapsed noncutting time during the return stroke is significant both in planning and in shaping. Consequently, these operations are not efficient or economical, except for low-quantity production. Efficiency of the operation can be improved by equipping planers with tool holders and tools that cut in both directions of table travel.

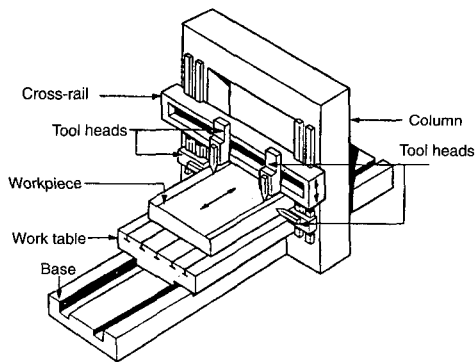


Figure 2

When confronted with texts like that, students will be using awareness of text structuring to improve their comprehension processes. Notice the combination of an expanded definition kind of prose in the first paragraph with a process description one in the second.

4. Different options to be used as pre- during- or post-reading activities

Notice that this listing which is by no means a complete attempt at showing how to exercise relation text-drawings in both directions: having students draw or referring to existing drawings. Students can:

1. Write captions under schematic illustrations, thus summarizing a text.
2. Label drawings.
3. Write a paragraph after a table.
4. Read a paragraph and illustrate or complete an illustration.
5. Complete tables using information provided in text.
6. Write a paragraph after a table including contrastive information.
7. Study a drawing and complete a table with information like shape, material, uses, etc.
8. Complete a "cloze" paragraph with information from a drawing.
9. Write sentences saying where given components are located.
10. Insert references to the accompanying illustrations to a passage.

We hope our students to be independent readers in their field. This article pretends to show one of the many activities that can be successfully adapted from the many reference books on the market to achieve that aim.

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