GAGNÉ'S MODEL OF LEARNING AND THE DESIGNING OF INSTRUCTIONAL EVENTS FOR ESP

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RESUMO

Após uma revisão das fases de aprendizagem descritas por Gagné, procura-se aplicar sua teoria ao planejamento de ensino de um aspecto da língua para ESP, sugerindo-se os passos e procedimentos para implementar a sua execução.

During their lifetime, people are submitted to experiences in certain circumstances which affect and alter their whole being, changing the way they think, feel and act. These experiences may be random and unforeseen as when a child hurts himself with a sharp blade or with fire. In one way or the other, these experiences will change this child's behaviour in that, in the future, he will be cautious when dealing with situations such as those which caused him to be hurt. In other words, he will have learned a lesson and we may say that this bit of learning will very likely be quite permanent. On the other hand, learning may come about as a natural result of the maturation process, as when a child learns to walk.

Not all learning, however, can be said to be accidental or natural as has been described above. In this paper, an attempt will be made to illustrate how the careful design of instructional events, built on psychological bases, can lead to more efficient learning.

THE TEACHING AND LEARNING PROCESS

We shall now deal with yet another type of learning, one which obtains from an interaction of carefully contrived situations and experiences and the out
come of which is expected to enable certain predictable performances to occur. Interaction with such situations is designed in such a way that the learner's resulting performance is improved. The design and carrying out of instruction, or the teaching process, then, is said to be a purposeful activity with definite goals which the teacher expects to attain through carefully selected and organized means and materials. A set of these resources intended to promote learning are, in Gagné's (1980) terms, instructional events. Learning, in this sense, may then be conceived as a rather intricate process of interaction with one's environment, resulting, to a certain degree, in a permanent state of knowledge. And the whole business of supplying instruction as a means of bringing about desired changes in the student's performance and the effort made by the student himself to accomplish these changes make up the Teaching-Learning Process, hereafter signalled the T-L process.

The most relevant aim in any educational programme is to promote learning. Furthermore, in contemporary educational approaches, the role of the student has shifted from that of a merely passive receiver of instruction to the central concern of any T-L process. Student-centred approaches take into account what the learner is expected to do, i.e., what kind of performance he is supposed to exhibit in order to offer evidence that learning has taken place. The attitude, commonly adopted by some teachers, expressed as "What am I to do during the 50 minutes facing my class?" is now outdated and has been substituted by the healthier concept of the student as an active cooperative and co-responsible participant, the one upon whom all attention should converge in the T-L process.

In foreign-language teaching, and especially in ESP, this change in attitude has caused the pendulum to sway away from grammar-based syllabuses towards functionally oriented ones for the very reason that the linguistic content of the former syllabuses was selected.
subjectively by the course designer or by the teacher, irrespective of the student's needs in his learning of a foreign language. The question faced by the course designer/teacher is no longer "What am I to include in my teaching units?", but "What does my student need the language for?" or "What language items will be most useful for my student's communicative needs?" An analysis of the student's needs will then provide the teacher with the answer to his first question. Aided by the description of the expected final product, in the form of clearly defined objectives, the teacher can then select and organize instructional events which will most effectively lead the learner towards those goals. This is surely no random activity. The design of instruction requires the teacher to be at least familiar with a concept of learning and how learning occurs, i.e., what goes on in the student's mind as learning develops. This is an important psychological ingredient which warrants the effectiveness of any T-L process.

HOW CAN LEARNING BE DESCRIBED?

Learning can not be explained simply as a result of habit formation brought about by the association of external stimuli and responses, as behaviourists would have it, but must be viewed as an essentially internal, or mental, process. The capability to reason is, in fact, what differentiates man from other animals.

In his neo-behaviourist approach, Gagne (1980) describes different phases of learning which relate the internal process to a set of external events. The role of these external factors is to initiate, activate and maintain learning and, thus, the teacher, when selecting and organizing his instructional events, does so with the intention of affecting the learning and, thus, the teacher, when selecting and organizing his instructional events, does so with intention of affecting the learning process, insomuch that it is facilitated in its
different phases. The flow of information that derives initially from the learner's environment ranges over successive phases, as stated by Gagné: motivation, apprehending, acquisition, retention, generalization, performance, and, closing the circuit, feedback.

PHASES OF LEARNING AND ESP

Following is a description of each one of these phases and how they relate to the learning of ESP. Due to the need for brevity, an effort will be made to minimize the complexities of the theory, hopefully without oversimplifying or distorting Gagné's ideas. Our intention in this paper is to ensure a minimal understanding of the make up of a learning act. We shall then go on to illustrate how the planning of instructional events may be put into effect in an ESP course design. For this, we shall make use of a teaching unit used in an Ingles Técnico II class, during the last semester. A description of this unit will be dealt with in the next section.

1. The Motivation Phase

Motivation may be defined as a fundamental human impulse by which an individual strives to attain a goal and is rewarded on attaining it. A state of expectancy is established in anticipation of the reward. By establishing and intensifying motivation, the teacher prepares the student for the learning act. This may be done by:

- informing the learner about the type of performance expected of him;
- previously promoting satisfaction of his expectancy, through a successful experience.

In an ESP course, this stage is of utmost importance. The student is usually a false-beginner who brings to the ESP classroom some knowledge of English; but, in most cases, his previous unsuccessful experience with English has left him terribly frustrated. This attitude
can (and should) be changed. By showing him that reading academic texts is not the "bicho-de-seete-cabeças" he thinks it is, we may gradually win him over to our side, by developing a positive attitude towards the subject.

2. The Apprehending Phase

Apprehension results from directing the learner's attention to what is supposed to be learned. In doing so, the teacher activates his selective perception, that is, activates his perception only of what is relevant to the learning act. The student learns to discriminate between what is essential and what is redundant in the learning situation. Different types of stimulation may be used:

- in oral language, a change in pitch, strategic pauses, etc.;
- body language, such as gesticulation, facial expression, etc.;
- a sudden change in focus; a contrast;
- in written texts, typographical evidence, such as quotation marks, bold print, underlining, and so forth;
- illustrations, charts and other non-linear resources.

In ESP, different reading skills have been taught, ranging from the simplest, as the use of typographical clues in scanning for information to the more complex recognition of discourse markers. The whole scope of clues are attention-callers which enable the student to develop his selective perception of what is most relevant to his ends.

3. The Acquisition Phase

What was perceived in the previous stage is now transformed by the learner to fit an already existing mental frame, so that what is to be learned can be more easily stored in his short-term memory. This storage does not happen in the same way with all the individuals in a same group. The fact that each student has to begin with, a different mental structure with which new
learning is associated, in the codifying process, makes it clear that what is remembered is never exactly the same as that which is entered into short-term memory. Distortions, such as simplification or elaboration, take place. To minimize this effect, the teacher can adopt any of the following procedures:
- group information into consistent blocks presented in the form of a structural whole;
- associate new information with previously learned concepts or skills;
- simplify a new concept, giving it the form of a principle.

Information presented in this manner will be retained for longer periods of time. The student will be encouraged, moreover, to develop his own codifying strategies. This applies to the presentation of language items, of rhetorical functions, or to any other learning aspects in ESP.

4. The Retention Phase

According to Gagné (1980), little is known about this phase, in which the stimuli enter the long-term memory and are stored for future retrieval. However, some plausible characteristics of long-term memory have surfaced from tentative research:
- that which enters long-term memory is relatively permanent;
- some types of information may be subject to interference from other related information, modifying what is retained;
- ageing may cause information to be gradually forgotten.

5. The Recall Phase

Information learned is now retrieved for reproduction as performance. Retrieval is obtained by means of external stimulation. Cues are provided for the student in order to 'set' his memory, as, for instance, referring to previously learned matter which is pertinent or equivalent to what is to be retrieved. Clues for re
trieval of information will be more effective if they are provided beforehand, during the phase when selec-
tive perception took place. If the student is to relate what he recalls to that which he has had his attention directed to previously, his retrieval will surely be prompter. The provision of clues, either initially or at this stage, will help the learner to organize his own, in the form of learning strategies.

6. The Generalization Phase

Retrieval of what has been learned can now be ap-
plied to new situations, in a process known as transfer
of learning. At this stage, opportunities should be pro-
vided so that the student can practice the capability
of transferring learning to new contexts, different from
the original situation in which learning was acquired.

Care should be taken, in ESP, to provide both hori-
mental transfer, in which the student applies his knowl-
edge to new contexts, and vertical transfer, in which
previously learned concepts can be taken as the point
of departure for more complex learning.

7. The Performance Phase

Performance is evidence of the degree of learning
that has been accomplished. Sometimes the teacher imag-
ines that learning has resulted from the instruction
he has supplied. How often do teachers resort to ques-
tions such as "Have you learned this?" or "Do you know
how to do this?" to which his student's affirmative
answer is the only evidence required to assure him that
learning has taken place?

Performance, then has a twofold function: to pro-
vide feedback, first to the student informing him about
his progress in the learning process and, second, to the
teacher, providing him with information about the ex-
tent to which his teaching aims have been reached and
allowing for an evaluation of the efficiency of his de-
sign and execution of instruction.
In ESP, Performance is evidence that learning has occurred when the student demonstrates that he has acquired

"...working reading knowledge of English (which) helps him to obtain, localize and apply the information and ideas in texts related to his specialism."(Holmes, 1983)

8. The Feedback Phase

Feedback is the phase where both the teacher and the student finally obtain knowledge of the extent to which the T-L process has been successful. Once performance has been evaluated, feedback ensues; if the objectives have been reached, then reinforcement sets in, because the student's initial expectancy is finally rewarded. However, only one instance of performance is not sufficient to ensure that learning has, in fact, taken place. Several opportunities must be presented to ensure the validity of the feedback.

The preceding descriptions have been given a linear presentation. It must not be inferred, however, that the T-L process is in any way static as this linearity could suggest.

THE UNIT

Before going on to illustrate the actual instructional event, some explanation of the Unit we shall use as a basis for our study is called for, if we are to justify the selection of the instructional events proposed.

The title of this Unit, *Noun Modification*, states very little. There are different aspects of modification and different degrees of complexity involved, such as pre-versus post-modification, nominal modifiers and simple versus compound modifiers. Whoever deals with this material will have to refer to the objective, as stated, in order to have a clear view of what is intended:
"Given a text containing compound modifiers the student should be able to infer and provide their meanings, by means of paraphrasing".

The study of this language item was included in our programme first, because of its high frequency in academic texts and, second because it constitutes a major learning problem: nothing similar occurs in Portuguese. The inclusion of this instruction on language (as opposed to reading strategies) can be further justified in terms of the for-reactions expressed by ESP teachers in a consensus on the teaching or not of language items, in ESP:

"Especially in reading intensively, it is important to have a reasonable knowledge of the language itself. This core of language can help to optimise the use of reading strategies." (Holmes, 1983)

Simple modifiers, their position preceding head nouns, and nominal modifiers were considered previous learning for this particular Unit, insofar as it was intended for Técnico II, or intermediate-level students. Post modification should pose no problem for the Brazilian student, at this level, due to the one-to-one correspondence between Portuguese and English constructions of this kind, which ensures facilitation. For this reason, post-modification structures will be taken as a starting point, in an analysis-to-synthesis approach for the ensuing instruction on the more complex matter of compound pre-modifiers.

In the following section, we shall try to illustrate how a series of instructional events, corresponding to each phase of the learning process has been applied in the design of a unit for ESP. We have considered, for the sake of illustration, two requisites (Position of the attributive Adjective and nominal Adjective and nominal Adjectives in Nominal Compounds) and the Unit-content proper (Compound Pre-modifiers).
outs for the students can be found in the Appendix.
We would like to remind the reader that the linear format of the presentation should not imply a lack of dynamism in the carrying out of this design, in the classroom.

LEARNING EVENT I
Content: Position of attributive Adjectives

<table>
<thead>
<tr>
<th>PHASES OF INSTRUCTION</th>
<th>EVENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTIVATION</td>
<td>MOTIVATE AND INFORM OBJECTIVE: Refer to the possibility of qualifying Nouns. Inform that students will be expected to give qualities to Nouns, using an Adjective attributively.</td>
</tr>
<tr>
<td>APPREHENSION</td>
<td>DIRECT ATTENTION AND PROMOTE SELECTIVE PERCEPTION: Referring to examples, in Portuguese, of Adjectives functioning as attributives in Noun Phrases, direct st's attention to the qualifying word and its position in regards the Noun.</td>
</tr>
<tr>
<td>ACQUISITION</td>
<td>PRESENT NEW LEARNING: Show how Modifiers precede Nouns, in English, and how they can be identified by their position in the phrase. Supply examples. Verify understanding by asking student to identify Modifiers in given phrases.</td>
</tr>
<tr>
<td>RETENTION</td>
<td>PROMOTE RETENTION: Provide exercises, as (a) phrases for student to identify the Noun modifier, or, (b) phrases for the student to in</td>
</tr>
</tbody>
</table>
sert Adjectives given, as Noun pre-modifiers.

RETRIEVAL AND GENERALIZATION

INTENSIFY RETENTION BY MEANS OF PRACTICE: Provide phrases with Adjectives placed after the Noun. (post-modification). Student re-writes the phrases, using pre-modification.

PROMOTE TRANSFER: Students underline pre-modifying Adjectives in a given text.

PERFORMANCE AND FEEDBACK

EVALUATE PERFORMANCE AND SUPPLY FEEDBACK: Student performs, placing Modifiers before Nouns. Results provide feedback to both student and teacher.

LEARNING EVENT II
Content: Nominal Adjectives in Nominal Compounds

PHASES OF INSTRUCTION

E V E N T S

MOTIVATION

MOTIVATE AND INFORM OBJECTIVE: Refer to how Nouns are specified in Portuguese (toalha de mesa). Inform student that he will be expected to specify types, classes, functions of Nouns by placing the modifier Noun before it (table cloth).

APPREHENSION

DIRECT ATTENTION AND PROMOTE SELECTIVE PERCEPTION: Recall information about position of modifier
Adjective (Learning event I). Present instances of Nominal Compounds and ask student to identify head Noun and Modifier.

ACQUISITION

PRESENT NEW LEARNING: Identify nominal Adjective as modifier of Head Noun. Present further examples of Nominal Compounds: students identify Modifiers and Head Nouns. Students develop problem solving skills by combining concepts and principles.

RETENTION

PROMOTE RETENTION: Present opportunities for practice. Student underlines in a given text all Nominal Compounds and infers meanings. Teacher helps out with cues.

RETRIEVAL AND GENERALIZATION

INTENSIFY RETENTION BY PRACTICE AND PROMOTE TRANSFER: Provide additional texts containing Nominal Compounds: students identify and give meanings, in Portuguese.

PERFORMANCE AND FEEDBACK

EVALUATE PERFORMANCE AND SUPPLY FEEDBACK: Student performs by supplying Portuguese equivalent for Nominal Compounds found in text. Evaluation of extent of learning and feedback ensue.

INSTRUCTIONAL EVENT III
Content: Compound Pre-modifiers
<table>
<thead>
<tr>
<th>PHASES OF INSTRUCTION</th>
<th>EVENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTIVATION</td>
<td>MOTIVATE AND INFORM OBJECTIVE: Supply previous satisfaction of expectancy by means of a successful experience, through obvious examples of compound modifiers (e.g. data-processing system). Set further challenge. Inform expected outcome: infer meaning of compound Pre-modifiers.</td>
</tr>
<tr>
<td>APPREHENSION</td>
<td>DIRECT ATTENTION AND PROMOTE SELECTIVE PERCEPTION: Review position and function of Modifiers. Provide samples of post-modifiers in expanded clauses (e.g. a system for processing data). Student identifies dependent clause as modifier.</td>
</tr>
<tr>
<td>ACQUISITION</td>
<td>PRESENT NEW LEARNING: Refer to concise or synthetic nature of academic texts. Induce Student to discover the process whereby compound Adjectives are formed, in samples given.</td>
</tr>
<tr>
<td>RETENTION</td>
<td>PROMOTE RETENTION: Present further opportunities for practice: (a) examples of expanded modifying clauses and corresponding pre-modifying compound Adjective; (b) examples of premodifying compound Adjectives for student to paraphrase.</td>
</tr>
</tbody>
</table>
RETRIEVAL AND GENERALIZATION

INTENSIFY RETENTION BY MEANS OF PRACTICE AND PROMOTE TRANSFER:
Provide additional compound Adjectives as Noun pre-modifiers.
Students give equivalent in Portuguese. Provide text. Student underlines compound pre-modifiers and supplies meanings in Portuguese. Teacher promotes development of student's own learning strategies.

PERFORMANCE AND FEEDBACK

EVALUATE PERFORMANCE AND PROVIDE FEEDBACK: Student performs by supplying Portuguese equivalents for compound pre-modifiers in Nominal Phrases found in text. Evaluation of extent of learning and feedback ensue.

CONCLUSION

In his study of the learning process, Gagné (1980) deals with four important aspects: Phases of Learning, Internal (mental) Processes, Instructional Events and Learning Outcomes. We have restricted our work to the discussion of two of these aspects, namely, Phases of Learning and Instructional Events, relating the former to the design of instruction for ESP. In our attempt to do this, we have selected a language unit for its high frequency in academic texts, for its contrastive complexity for Brazilian students and also because little has been written about it, to our knowledge. For these reasons, we considered the topic, possibly, to be of some interest to other teachers in the same field. In our Técnico II classes, this structure was initially thought to be rather baffling, as never before had this aspect been worked on with them. After instruction, however they were able to pick out compound pre-modifiers
and, to a certain extent, provide adequate meanings for them in Portuguese, or to paraphrase them, in English.

Considering this work has merely been a tentative effort to improve our T-L process, in ESP, rather a hypothesis than a finished product, it is subject to reformulation and improvement. Therefore, any suggestions that contribute to this will be truly welcome.

REFERENCES


APPENDIX

UNIVERSIDADE FEDERAL DE ALAGOAS
COHIA - LEM - INGLÊS TÉCNICO II

MODIFICAÇÃO DE SUBSTANTIVOS
(Adjetivos Compostos)

Observe as frases abaixo. Você será capaz de dizer qual a função das palavras sublinhadas em relação ao substantivo? E será capaz de fornecer o significado, em Português, de cada uma delas?

1. Data-processing systems
2. A twenty-volume dictionary
3. A man-made satellite

Nesta Unidade, você vai aprender a depreender o significado dos adjetivos compostos que precedem substantivos, modificando-os.

Se você acertou as perguntas acima, então deve ter observado que o processo de estruturação desses modificadores não encontra correspondência em Português. De fato, como você já deve ter descoberto, essas frases podem ser traduzidas assim:

1. Sistema de processamento de dados
2. Um dicionário de vinte volumes
3. Um satélite feito pelo homem

No entanto, poderemos também dizer:
1. A system for processing data;
2. A dictionary consisting of twenty volumes;
3. A satellite made by man;

Mas, você se lembra do que já foi dito a respeito da linguagem de textos acadêmicos? Ela é mais precisa e objetiva, não é? Outra característica é a sua concisão, ou caráter sintético. Por essa razão, o uso de pré-modificação de substantivos por meio de adjetivos compostos é preferido em textos desse tipo.

Vejamos mais alguns exemplos de frases "analíticas" e seus correspondentes, "sintéticos":

- Walls made from fire bricks (refratários)
  Fire-brick walls;
Veja outros:
- Deposits of salt rock
- A watch that is plated with gold
- A ship that is bound for Europe

Agora continue você. Forneça as frases correspondentes ao adjetivo composto, modificador do substantivo:

1. ________________________ = A fast-moving train
2. ________________________ = A fire-resistant material
3. ________________________ = First-class accommodations
4. ________________________ = A five-story building
5. ________________________ = A ten-dollar watch
6. ________________________ = A twenty-inch board
7. ________________________ = Ripe-looking tomatoes
8. ________________________ = A much-admired actor
9. ________________________ = A hard-working boy
10. ________________________ = A smoke-filled room

Mostre, agora, que entendeu o processo. Dê os equivalentes em Português das frases que seguem. Procure desenvolver suas próprias estratégias cognitivas, para descobrir o significado de cada adjetivo composto.

1. Disease-causing microbes = Microbes that cause diseases
   = Micróbios que causam doenças ou, Micróbios causadoras de doenças
2. Pain-killing drugs = ________________________
3. Spanish-speaking visitor = ________________________
4. Sodium-containing solutions = ________________________
5. A partly-finished story = ________________________
6. Fully developed plants = ________________________
7. A badly trained worker = ________________________
8. Sun-dried fruit = ________________________