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.Or, 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

cóme 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 re-
sources intended to promote learning are, in Gagné's
(1980) terms, *instructional events*. Learning, in this
sense, amy then be conceived as a rather intricate pro
cess 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 amde by the student himself
to accomplish these changes make up the *Teaching-Learn
ing Process*, hereafter signalled the T-L process.
     The most relevant aim in any educational programme
is to promote learning. Furthermore,in contemporary edu
cational 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 adopt
ed by some teachers, expressed as *"What am I to do dur
ing 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 par
ticipant, the one upon whom all attention should con-
verge in the T-L process.
     In foreign-language teaching,and especially in ESP,
this change in attitude has caused the pendullum to '
sway away from grammar-based sullabuses towards func-
tionally oriented ones for the very reason that the lin
guistic content of the former sullabuses 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 use ful 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 de scription of the expected final product, in the form of clearly defined objectives, the teacher can then select and organize instructional events which will most ef- fectively lead the learner towards those goals. This is surely no random activity. The sedign of instruction re quires the teacher to be at least familiar with a con- cept 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 ex ternal 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, Gangé (1980) de scribes 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 select- ing and organizing his instructional events, does so with the intention of affecting the learning and, thus, the teacher, when selecting and organizing his instruc tional 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,appre
hending, acquisition, retention, generalization, per-
formance 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 mini
mize the complexities of the theory, hopefully without
oversimplifying or distorting Gagné's ideas.Our inten-
tion in this paper is to ensure a minimal understand-
ing 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 Inglês Técnico II class, during the last semestre.
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 antecipation of the reward. By estab
lished in antecipation 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 perform
ance expected of him;

- previously promoting satisfaction of his expec-
tancy, through a successful experience.

In an ESP course, this stage is of utmost import-
ance. 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 read-
ing academic texts is not the *"bicho-de-sete-cabeças"*
he thinks it is, we may gradually win him over to our
side,by developing a positive attitude towards the sub
ject.

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 reduntant in the
learning situation. Different types os stimulation may
be used:

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

In ESP, different reading skills have been taught,
ranging from the simplest, as the use of tipographical
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 rel
evant 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 individ-
uals 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 'stir' his memory, as, for instance, referrin 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
zontal* 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 ac-quired

> "*...working reading knowledge of English (which) helps him to obtain, localise 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 perform ance has been evaluated, feedback ensues; if the objec tives have been reached,then reinforcement sets in, be cause the student's initial expectancy is finally re-warded. However, only one instance of performance is not sufficient to ensure that learning has, in fact, ' taken place. Several oportunities must be presented to ensure the validity of the feedback.

The preceding descriptions have been given a lin-ear 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 instruc-tional 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 modifica-tion 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 intend ed:

> *"Given a test containing compound modify-*
> *ers 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 ma
jor learning problem: nothing similar occurs in   ⊤
Portuguese. The inclusion of this instruction on lan-
guage (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 know-*
> *ledge of the language itself. This core*
> *of language can heïp 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 in
tended 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 construc
tions of this kind, which ensures facilitation.For this
reason, post-modification structures will be taken as
a starting point, in ana analysis-to-synthesis approach
for the ensueing instruction on the more complex matter
of compound pre-modifiers.

In the following section, we shall try to illus-
trate how a series of instructional events,correspond-
ing to each phase of the learning process has been ap-
plied in the design of a unit for ESP.We have consider
ed, for the sake of illustration, two requisites (Posi
tion of the attibutive Adjective and nominal Adjective
and nominal Adjectives in Nominal Compounds) and the '
Unit-content proper (Compound Pre-modifiers).The hand-

outs for the students can be found in the Appendix.
     We would like to remind the reader that the lin-
ear 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

PHASES OF INSTRUCTION	E V E N T S
MOTIVATION	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.
APPREHENSION	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.
ACQUISITION	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.
RETENTION	PROMOTE RETENTION: Provide exercises, as (a) phrases for student to identify the Noun modifier, or, (b) phrases for the student to in

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

PHASES OF INSTRUCTION	E V E N T S
MOTIVATION	MOTIVATE AND INFORM OBJECTIVE: Supply previous satisfaction of expectancy by means of a success-ful experience, through *obvious* examples of compound modifiers (e.g. data-processing system). Set further challenge. Inform ex-pected outcome: infer meaning of compound Pre-modifiers.
APPREHENSION	DIRECT ATTENTION AND PROMOTE SE-LECTIVE PERCEPTION: Review posi-tion and function of Modifiers. Provide samples of post-modifi-ers in expanded clauses (e.g. a system for processing data). Student identifies dependent clause as modifier.
ACQUISITION	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.
RETENTION	PROMOTE RETENTION: Present fur-ther opportunities for practice: (a) examples of expanded modify-ing clauses and corresponding pre-modifying compound Adjective; (b) examples of premodifying com-pound Adjectives for student to paraphrase.

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 hy_
pothesis than a finished product, it is subject to re-
formulation and improvement.There-fore,any suggestions
that contribute to this will be truly welcome.

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APPENDIX

UNIVERSIDADE FEDERAL DE ALAGOAS
CCHLA - LEM - INGLÊS TÉCNICO II

MODIFICAÇÃO DE SUBSTANTIVOS
(Adjetivos Compostos)

Observe as frases abaixo. Você será capaz de dizer qual a função das pa-
lavras 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 proces-
so 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, poderíamos 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 da pré-modifi-
cação de substantivos por meio de adjetivos compostos é preferido em tex-
tos desse tipo.
Vejemos mais alguns exemplos de frases "analíticas" e seus correspondentes,
"sintéticos":

> ÷ Walls made from fire bricks (refratários)
>   Fire-brick walls;

2

Veja outros:
- Deposits of salt rock   ----   Salt-rock deposits
- A watch that is plated with gold --- A gold-plated watch
- A ship that is bound for Europe ----- A Europe-bound ship

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 accomodations

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, pora descobrir o significado de cada adjetivo composto.

0. Disease-causing microbes = Microbes that cause diseases
                             = Micróbios que causam doenças ou,
                                Micróbios causadoras de doenças

1. Rice-growing farmers   = _____

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   = _____