The Academic Engineering Discourse: Linguistic Choices and Communication Purposes

Florentina BĂRBULESCU*

Rezumat

Lucrarea propune o abordare a discursului oral pornind de la analiza unei expuneri, în limba engleză, în cadrul unui curs din domeniul tehnic (calculatoare) pentru studenţii anului I ai unei universități nord-americanе. Studiul se face din perspectiva analizei fazale, lucrarea de faţă punând în discuţie una dintre cele cinci faze ale discursului: faza de structurare, faza conţinutului, faza evaluării, faza interacţiunii şi faza de prezentare a concluziilor. Faza de structurare a discursului, cea analizată în lucrarea de faţă, este abordată atât sub aspectul său intenţional, cât şi ca mod de realizare, lucrarea contribuind în acest fel la o mai bună înţelegere a structurii intime a discursului tehnic.

1. Discourse phases and their purpose

The essence of this study is to present some distinct features of an oral engineering discourse.

The engineering text our analysis is based on, represents the transcript of the recording of a lecture given to first year technical students and consists of about 390 structures (independent and complex sentences). The text refers to the domain of computer programming and deals mainly with linear equations (root solving) and a scientific high-level programming language – FORTRAN.

The analysis we have undertaken was aimed to discuss several discoursal properties and identify specific ways in which they are actualized in a particular text.

* Ph. D., Lecturer, Department of Modern Languages, “Politehnica” University of Timişoara
Our proposed model of analysis has been selected from among other models (see Superceanu Rodica 2000:155) and is mostly based on the functionalist phasal approach, as we start with discussing the purpose of the discourse phases and end by identifying structures that help discourse producers in achieving the targeted purpose.

In the engineering discourse under analysis, like in many others of a similar kind one can distinguish five major phases each having a special purpose which contributes to the general purpose of the entire discourse.

The term “phase” is used with the meaning it commonly acquires in phasal analysis, each phase serving in the unfolding of the discourse. We did not use such labels as Prelude, Episode, End as we are not concerned with the linear structure of the discourse.

Considering each phase in particular we appreciate that:

- the discourse **structuring phase** is the one in which the lecturer explicitly indicates how he will proceed in the lecture, alerting the students about the content to come, thereby imposing a structure on the overall discourse;

- the **content phase** is the one in which mathematical and numerical principles are illustrated;

- the **evaluation phase** serves to indicate to students the value of each of the examples and helps them evaluate the material that has been presented and indicate the value to be placed on various parts of the content;

- the **conclusion phase**, refers both to partial conclusions (included whenever necessary within the discourse) and to the final conclusion. It has a multiple purpose:
  - to draw the students’ attention to the purpose of the examples in the content phase;
  - to connect examples the lecturer has just given to other examples provided in his lecture;
  - to synthesize major points of the informative content of the lecture;

- the **interaction phase** is the one in which the lecturer and the students most clearly enter in a dialog one with each other. Here, unlike other phases, the questions posed by the lecturer are actually meant to be answered; also the students pose questions and the lecturer answers them. It is also the phase in which the students comment on the material being presented and do even correct the lecturer after he has put a wrong information on the board.
Each of the above mentioned phases can provide a context for the actual analysis. In what follows we shall refer to one of these phases, namely, to the discourse structuring phase seeking to illustrate how linguistic choices reflect the purpose this phase is designed to serve.

2. The ideatical and interpersonal levels of the structuring discourse phase

Discussing the discourse structuring phase of the engineering discourse we distinguish an ideatical level (2.1) and an interpersonal level (2.2).

2.1 Considering the most significant processes at the ideatical level we observe that mental processes (2.1.1) predominate in this phase, being more than double the relational processes (2.1.2) and twice the number of action processes (2.1.3).

<table>
<thead>
<tr>
<th>mental processes</th>
<th>action processes</th>
<th>relational processes</th>
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Figure 1. The Ideatical Level of an Engineering Discourse. Discourse Structuring Phase

2.1.1 The processors of each of the mental processes (m. p.) alternate between the lecturer and the students. The lecturer is not only announcing the content of the lecture but is also inviting the students to share in his intelectual activity. Of these mental processes more than half are cognition processes, the rest being of verbalization and perception type.

<table>
<thead>
<tr>
<th>m. p. of cognition</th>
<th>m. p. of verbalization</th>
<th>m. p. of perception</th>
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Figure 2. Mental Processes. Discourse Structuring Phase

The fact that mental processes of cognition are so significant here seems particularly appropriate in a phase in which the lecturer explicitly involves the students in the unfolding of the information, thereby ensuring that the audience is aware of the nature of the activity in which both lecturer and students are engaged. To illustrate that, the following structures should be quoted:

(38) Another type of equation that we present … a root solving equation, might be as follows: …

(95) First of all you’ve got to look at the problem and decide on such aspects as: …
(190) Essentially we know the following: …

In the realization of this phase we can identify the presence of “you” and “we” indicating the processors of the information conveyed. A second noticeable feature is the ‘forward pointing’ lexicalization. The presence of word or word structures like “following”, “as follows”, “such as” accompanies many of the statements in this phase.

**Mental processes of verbalization** insure the audience participation which is evident in the speakers’ selection of participant roles. The lecturer could have chosen himself as the sole processor of verbalization (as he is the one doing the imparting of information), but he chooses instead to share the role with his audience. Examples:

(116) The first question we ask is …
(192) We’re gonna talk about the first technique.

**Mental processes of perception** also have as processors both the students and the lecturer. Examples:

(95) First of all you gotta look at the problem.
(112) Now you’ll see that …

2.1.2 Moving on to the next most significant type of predication we shall refer to the relational processes.

<table>
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<tr>
<th>identification relations</th>
<th>existential relations</th>
<th>attributive relations</th>
<th>locational relations</th>
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Figure 3. Relational Processes. Discourse Structuring Phase

Among this type of processes **identification relations** are the largest group. They serve to clarify the nature of the information about the material to be presented. Lexical items such as “topic” and “method” fill the identifier roles, thereby ensuring that students know exactly what the nature of information is. Examples:

(7) … root solving is gonna be the first topic …
(190) So, what are the methods of … ?

The focus is further reinforced in the next most significant type of relational processes - **existential processes**. Examples:

(37) … there are a number of techniques …
(83) … So, there are two steps.

Such relations are divised to get the students familiar with the kind of information which is to follow.

**Attributive relations** reinforce the above mentioned purpose but they do also
announce “the quality” (“easiest” or “best”) of the way to approach the information to be conveyed telling the students what “weight”to assign to each approach. Examples:

(17) So, here’s some equations that are not immediately obvious.
(38) … another type of equation, … would be even more complicated.
(267) What is the easiest way of determining … ?

**Locational relational processes** are spatial, indicating various places in equations and calculations that the lecturer has displayed on the board or transparencies. Most locations referred to are exophoric. Thus “that” mentioned in the following example is a board reference:

(280) But what’s an easy way of deriving … if I have a root in that interval ?

2.1.3 Action processes, though numerous as indicated above (Figure 1), are the least significant in the engineering discourse. The verbal groups are used to highlight the type of activities in which one engages in the discipline of engineering. The agents performing the action processes are the students as well as the lecturer. They are “generating approximations”, “writing down values or algorithms”, “plotting graphs” a.s.o.

2.2 The interpersonal level is characterized by more numerous speech functions than in any other phase of the lecture. Statements alter with directives, and questions with commands. The morphosyntactic stratum of this level indicates the presence of modal structures and modal verbs such as “going to” and “will”. “Wh”-questions do also abound. Both structures (modals and interrogatives) reinforce the purpose of this phase to announce the direction the lecturer is going to take. Examples:

(47) So, how do you find that ?
(116) So, how many roots are we talking about ?
(251) Well, we are dealing with a cubic, what do we know … ?

The questions, all rethorical, are posed to focus attention on the material the lecturer is introducing. Each question (the interpersonal content) is followed by an explanation that forms the basic content (the experiential content) of the lecture. The “wh”-questions allow the lecturer to direct the students’ attention without overusing the direct imperative. By using such questions, the lecturer’s attitude does not seem too distant or overly authoritative.

Related to this point, we shall put into evidence another type of selection specific to engineering discourses. When the lecturer chooses the imperative, five out of the six occurrences are realized by optative imperatives so that the lecturer will appear less
authorative. Examples:

(260) Let’s write down a very crude algorithm.
(325) Let’s start with a fresh interval.
(343) So, let’s take a look at this.

A jussive imperative is used only once to emphasize the special importance of a piece of information put on the board.

(333) Look at it!

The selection of two particular modalities (“going to” and “would”) serve the intentionality purpose or a direction or an intention pointing, and “indicates prediction and expectations” (Ewer, 1979: 9). Examples:

(112) We are gonna talk about two or three techniques.
(289) Now, I’ll put that in brackets because we’ll see …
(327) And now we would have to choose …

The other model which appears (“could”) indicates possibility whereas the negative form “can’t” suggests what is not possible to do. Examples:

(58) I could then plot this function.
(72) … you can’t do integrals explicitly.

3. Conclusions

In conclusion, the purpose of interpersonal realizations (2.2) is to reinforce ideational ones (2.1) in which, as we noted above, the students are invited to share the intellectual activity of the lecturer. This invitation is explicitly indicated in the selection of the mental processes of cognition (2.1.1). It is by posing “wh”-questions and using modals that the lecturer seeks to further involve the students in the content.

The discourse structuring phase develops at various points throughout the lecture and its presence is due to the fact that the lecturer is explicitly structuring the whole of the discourse by announcing the information that will come.

References
