

# The role of IRF exchanges in the discursive dynamics of e-mail tutored interactions<sup>1</sup>.

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## Abstract.

Initiation, Response and Follow-up (IRF) exchanges produced by a student and her tutor in an internet-based tutorial interaction have been analyzed in terms of the multifunctional characteristics of each utterance. Different functions, related to different purposes, were observed in the initiation, response and follow-up moves performed by the student. The control over the interaction was shared by both student and tutor. The simultaneous and interwoven occurrence of different chains of IRF exchanges is suggested as a typical structural feature of tutoring via the internet which helps us to account for the distinctive nature of teaching and learning dialogues using email.

## Introduction

One of the first discourse modalities observed in classrooms, since tape recordings have been available, is the IRF or IRE exchange. In two independent works, Sinclair and Coulthard (1975), and Mehan (1979) observed that the teacher usually initiates (I) an exchange through questioning the whole class or one single student, who responds (R) the question, which is evaluated (E) or followed-up (F) by the teacher. In the classrooms investigated by Sinclair and Coulthard, the teacher rarely asked a question

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because he or she genuinely wanted to know the answer. Instead of that, the teacher wanted to know whether the student knew the answer (1975, p. 36-37). This feature was also observed by Mehan who adopted the term 'evaluate' to refer to the third move of the exchange.

Using this strategy, the teacher is able to interact with the class while he or she keeps control over the agenda. The role of the teacher in controlling the classroom agenda and the discourse has been recognized to be sustained by a set of implicit rules of classroom talk (Edwards and Mercer, 1987), whose function in guiding and structuring the activities was found to be performed by IRF exchanges. In analyzing secondary science classrooms, Lemke concluded that IRF exchanges, besides empowering the teacher who dictates these implicit rules, also made it difficult for them to listen to the thematic patterns of the students, since most of what the students say tend to fit into the thematic pattern set up by the teacher's initiation moves (1990, p. 32).

For many researchers, IRF is considered the 'essential teaching exchange' (Edwards and Westgate 1994, p. 124-125) or somewhat a norm of conduct (Hicks 1995, p. 66) followed in every classrooms. Some of them criticize what could be considered a mistaken belief that it encourages the student's participation (Lemke, 1990, p. 168), and others have found that dialogue structured in terms of evaluative IRF sequences might have an interactive authoritative character (Mortimer and Scott, 2002). A possible implication is that IRF exchanges disguise cultural reproduction through simulating the students' participation while the teacher guides the interaction and performs the role of conveying information.

The function of conveying information seems to be performed well by IRF exchange. However Wells (1993) argued that this is not the essence of the exchange. Drawing on both Leontiev and Halliday, Wells argued that functions are performed by the IRF exchange in relation to the diverse aims an activity system. Wells' contribution raises two issues. The first relates to the multi-functional nature of IRF and the question of the range of functions encompassed by this discursive modality. The second issue refers to one of the central claims of sociocultural research program: how the mutual influence between the structure and function of the dialogue, and the structure and

purpose of the action might account for meaning-making. In the present study, I focus on the first problem and specifically on investigating the dynamics of teaching-learning interactions performed through electronic interfaces. Hence, the aim of this study is to analyze the structure of e-mail exchanges between a student and teacher during a tutoring session, and the functions performed by each message.

In terms of educational purposes, the technological potential of e-mail can not be isolated from the whole world wide web environment, since most of the meaningful activities based on the internet might take advantage of its informational, imagetic and simulation facilities. In investigations of the quality of argumentation during science education activities, students were observed to make better use of both communicational and informational characteristics of the internet when they interacted through specially designed collaborative environments (Bell and Lin, 2000; Ravenscroft, 2000).

The research question informing the study reported in this article is: Does electronic mail have any special features which foster IRF exchanges that could be useful for educational purposes? My approach to answering this question began with an account of how students and teachers interact through the internet to construct meaning (Giordan, 2004). The present article focuses in one particular student-tutor interaction, which produced several IRF exchanges. The article analyses how these exchanges are structured, what functions they perform, and whether they could account for the flow of the dialogue.

### Methods.

The tutoring service we analyse here has been offered by teachers to primary and secondary school students from a Web site sponsored by a Brazilian scientific society. The teachers were asked to foster dialogue with each student in an attempt to provide them with an enduring channel of communication. The students were advised to browse specific Web pages, read printed material, and carry out simple science experiments and observations of correlated phenomena.

The interaction between tutor and student started with the student replying to a survey hosted on a Web page. After that, all correspondence was conducted by e-mail. The student's individual profile, obtained from the survey, proved to be very useful in providing background information and a rough initial context for the tutors (Giordan and Mello, 2001). Assuming that meaning should not be taken to reside in an isolated utterance, but should be seen to arise from interaction and from previous knowledge as well, a survey was used to build up an understanding of the situational context. Previous knowledge was accessed in terms of the students' opinions on school chemistry, e.g., what they do and do not like, and what is easy and difficult.

In order to analyse how IRF exchanges were structured, which functions they performed, and whether they might account for the flow of the dialogue, one episode was chosen from over two hundred. The criteria employed for the selection were related to the history and continuity of the interaction, and the successful attempt to satisfy the student's initial aim. For analytical purposes, each e-mail message was considered as an utterance and they were analysed according to the types of function they performed. The analysis considered three major facets of the exchanges concerning the situational, interactional and content aspects of the exchanges.

The texts were translated from Portuguese after deleting the message headings and changing the names of students and tutors to ensure anonymity. The Web pages were referred to by number in the sequence in which they appeared, without indicating the URL address. Some of the linguistic forms of the texts, such as abbreviation and greeting, were preserved in an attempt to provide the closest possible representation of the originals.

#### Analysis of the episode.

In this episode, Den is a female student of Year 11, and Raq is a female chemistry teacher. They exchanged 12 e-mail messages over 12 days in the early part of 1999. Two of the student's utterances were selected for analysis, since from them it is

possible to consider the main structural and functional aspects of the interaction. Three IRF exchanges were composed of a total of 8 utterances by both student and tutor.

### Utterance 3.

17. "Hi, Raq. I was very happy with your so quick answer. I considered very interesting the text about
18. sexual pheromones. I'd like to know if u have articles about breathing, digestion, reproduction etc.
19. Love from the new 'associate', Den."

Utterance 3 performed three different functions. The first one was the commitment shown by the student, who was proposing that she become a new associate of the scientific society which provided the tutoring service. This act of engagement is perhaps better understood as a way of expressing her pleasure regarding the whole experience of asking questions and getting answers, as well as a response to a previous invitation. The student was indicating to the tutor that she would like to continue the interaction. In structural terms, this shared commitment is performed by the following exchange:

### First IRF: Becoming an associate.

Tutor (2):

15. Any query, get in touch, ok ?

Student (3):

19. Love from the new 'associate', Den.

Tutor (4):

20. Hello Den, welcome to our Brazilian Chemistry Society !

The second function of Utterance 3 is to acknowledge receipt of an answer from the tutor. By doing this, the student positively confirmed the tutor's response both in terms of promptness and relevance to her purposes. This was a typical feedback move, which took part in triadic exchange initialized by the student, as stated below.

Before asking subject-specific information the student provided the tutor with the situational context through a description of her first attempt to solve a school task. The description thus addressed three different functions: the purpose of the question, which was to accomplish a school task; the strategy employed, searching an encyclopaedia; and the subject matter, chemistry in animals. This was all done in just one utterance, which suggests that the utterances in this episode had a condensed form.

In her reply to the student's first utterance, the tutor also used a condensed construction to situate the focus on pheromones. After qualifying that the resources were linked specifically to insect pheromones the tutor provided specific information through reference to particular URLs.

Second IRF: How interesting is sexual pheromones.

Student (1):

1. Hi. I've got a school task to do about chemistry in animals, I found something in Barsa, and I'd
2. like to know if u've got some texts, information, pictures, after all, anything regarding it to send me.

Tutor (2):

10. There's a very interesting issue that
11. involves chemistry knowledge and animals, specifically insects. It's about pheromones, volatile
12. substances produced by insects that have important functions in the life of these little beings.
13. I suggest you browse two texts in the Web:
14. URL1 and URL2.

Student (3):

17. Hi, Raq. I was very happy with your so quick answer. I considered very interesting the text about
18. sexual pheromones.

In spite of having been interested in the pheromones of insects, the student used the third utterance to ask for information on another specific subject, which is the third function of Utterance 3. This move cannot be considered an initiation, if we take into account the previous utterance of the tutor, in which she asked the student to clarify her question. Even though the student was asking for information, she was actually responding to the tutor's initiation, as can be observed in the following exchange.

### Third IRF: Chemistry or Biochemistry?

Tutor (2):

6. Chemistry in animals is a very extensive issue. We've got a branch of chemistry, the
7. biochemistry, which is concerned with the chemistry processes of living beings. (...) I'm not sure
10. what are you referring to when you say chemistry in animals?

Student (3):

18. I'd like to know if you've got articles about breathing, digestion, reproduction etc.

Tutor (4):

25. About digestion, ... reproduction, they are out of our field. If u wish to know more about the
26. chemistry of these processes I suggest you look for a biochemist, which is the best professional for
27. these issues.

In her feedback, the tutor refused to discuss what she classified as a subject for a biochemist. If we compare this refusal with the previous elaboration concerning the pheromones of insects, it is possible to conclude that the negotiation of the thematic pattern was not resolved. It is apparent in Utterance 9 that the student was ready to accept the advice to look for a biochemist.

### Utterance 9.

49. Hello Raq. My queries come from a school task. It is for Chemistry lessons. The subject is 'chemistry in
50. animals'. I found some issues in magazines about a variety of subject that link chemistry and animals,
51. including, the human beings, of course. I am looking for information about biochemistry almost daily on the
52. Internet, and subjects related to this, but it is so difficult. Some texts that I find are much
53. complex and hard, I don't understand anything that is written. Some subjects which I'm looking for
54. are caffeine (how does it act in the human body), alcohol, drugs, because all them involve chemistry in
55. the end. Next week I'm planning to go to the University, in the Biochemistry area and try to find
56. something that I could use. It is almost sure that I'll find, because the teacher recommended going
57. there!
58. Love, Den.
59. Ps.: I've got that page which I was not able to access, but the texts are very hard!

It is noteworthy that the decision to go to the university was taken after the visit had been recommended by the student's teacher. Nevertheless, it is also evident that the student had been influenced by the tutor's suggestion of looking for a biochemist, as we can see in the third IRF. Since the student did not mention the tutor's suggestion, one should consider this move of informing the tutor about a decision as the initiation of a new triadic exchange. In replying to it, the tutor came back to offer suggestions, which were not visibly accepted by the student in her feedback, since she simply assured the tutor of the visit. This exchange is presented in the fourth IRF and it is one of two triadic exchanges initiated by the student through Utterance 9.

Fourth IRF: The visit to the university.

Student (9):

55. Next week I'm planning to go to the University, in the Biochemistry area and try to find  
56. something that I could use. It is almost sure that I'll find, because the teacher recommended going  
57. there!

Tutor (10):

64. When you visit the Chemistry Department at the University, I suggest you to take questions and  
65. queries in order to benefit your research, ok ?

Student (11):

68. This week I arranged to go to the University, in the Biochemistry Department. Later  
69. on, I write telling what I find.

The second exchange, which was also initiated by the student, regards her difficulties in dealing with complex and schematic information. In the *post script*, while reporting to have found a Web page, the student qualified it as hard to understand. This move is best recognized as a feedback in the chain of triadic exchanges that was initiated in utterance 4, when the tutor provided a Web page that could not be accessed by the student. This chain also performed the function of sharing commitment between them.

The other announcement was visible after the student let the tutor know about her frequent searches on the internet. In this case, she employed the same conjunction,



'but', to express the adversity of the situation. In the reply, the tutor explicitly re-voiced this construction of the text as being complex and hard, and that was the reason it is described as the initiation of the fifth IRF. In this sense, the second function of Utterance 9 was to ask for support in dealing with the complexity of the texts.

Fifth IRF: How hard are the schemas!

Student (9):

51. I am looking for information about biochemistry almost daily on the
52. Internet, and issues related to this, but it is so difficult. Some texts that I find are very
53. complex and hard, I don't understand anything that is written.

Tutor (10):

61. You said that the texts are complex and hard.
62. What if I could help you to understand some of them ? Tell me which ones and ask questions so that
63. I could assist you. PUT YOUR QUERIES ON.

Student (11):

72. When I told about a hard text I was referring to the PUC's address. I
73. didn't understand hardly anything because the information was in the form of schema, which
74. raise many difficulties. If it were written in text, properly speaking, the comprehension would be
75. easier.

All the remaining moves in Utterance 9 were a sort of recollection provided by the student, since all the information has already been explicitly or implicitly conveyed in the previous utterances. This recollection can be explained if we consider it as a response to a tutor's initiation, which is visible in utterance 8 in the sixth IRF. Asking these questions, she encouraged the student to plan a schedule for the school task. In the response, the student proposed the schedule, in which it is visible the interest on biochemical processes is visible and also the influence of the tutor's suggestions, for example, the pheromones.

Sixth IRF: Planning the task.

Tutor (8):

39. Are your queries personal or are

40. you doing some school task ? Which is the discipline ?

Student (9):

49. My queries come from a school task. It is for Chemistry lessons. The subject is 'chemistry in animals'. I found some issues in magazines about a variety of subject that link chemistry and animals,

51. including, the human beings, of course.

53. Some subjects which I'm looking for

54. are caffeine (how does it act in the human body), alcohol, drugs, because all of them involve

55. chemistry.

Tutor (10):

65. I noted you're interested in

66. biochemical processes (...) and their consequences to our health.

67. Is it the structure of the school task ? If not, what about we plan one ?

Student (11):

69. My task does not have a schedule, say, rigid, I can talk about

70. everything that involves chemistry in animals, from processes like digestion, breathing, to

71. alcohol, caffeine, etc, acting in our organism. I can't forget the irrational animals, which take part

72. in the work as well.

75. Back to the structure you suggested, I did something like that:

76. - 1<sup>st</sup> some history, the origin of studies in this field;

77. -2<sup>nd</sup> I'll put the processes, like digestion ...;

78. -3<sup>rd</sup> I'll comment information related to human beings;

79. -4<sup>th</sup> I'll tell about irrational animals, including the texts about pheromones;

80. -5<sup>th</sup> Conclusions.

81. I'm not sure if it is exactly what you referred to, but just in case!

### Discussion.

Analysis of Utterances 3 and 9 reveal a diversity of functions, which were related to the different purposes of the student. In Utterance 3, she fostered commitment and asked for information in response to the tutor, and acknowledged the feed back of the tutor; in Utterance 9, the student informed and asked for support to initiate an exchange, and used a recollection to respond to the tutor. The multifunctionality of the utterances is a characteristic of e-mail communication that has been reported in educational uses of e-mail (der Meij and Boersma, 2002), as well as in other uses (Yates, 1996). We suggest that the condensed nature of the utterances and the

asynchronicity of the exchanges might account for the multifunctionality within each utterance, since these are typical features of the e-mail communication. But, what are the consequences of these features to the dynamics of the dialogue between student and tutor?

The analysis of the third IRF revealed the student's concern to understand the Chemistry of biological processes. A consequence of this motivation was visible in the fourth IRF, in which she announced her plans to visit the university. The third and fourth IRF shaped a chain of contributions oriented towards this student's purpose. In the third IRF, the tutor controlled the interaction, but in the fourth exchange, the student took the floor and therefore the control over the interaction. The result of this was the proposal of a new activity, in which there was no place for the tutor. It is noteworthy that the tutor's suggestions can be considered as potential instruments to initiate, through the questions, and to control the future interactions through assessing the answers with follow-up queries.

Another chain was shaped by the second and sixth exchanges, since they referred to the situational context that motivated the student to apply to the tutoring service and particularly to the strategies employed by both student and tutor to accomplish the school task. In the first instance, the student had the control over the interaction, since she demanded answers from the tutor and evaluated them positively. In the sequence, other information was provided by the tutor, and the pattern of the exchange remained the same until the tutor asked for information about the source of the student's queries. At this point, the tutor took the control over the interaction and, as a result, the student provided answers, and eventually a schedule for accomplishing the school task.

The third chain of exchanges is shaped by the first and fifth IRF. This chain was responsible for fostering the engagement of the student during the interaction. In this case, the role of the tutor was to support the student with respect to the positive feeling of becoming an associate, and the negative feeling of not understanding the texts. In spite of the dispute over the thematic pattern and over the control of the interaction, a supportative atmosphere seemed to play an important function in

maintaining the flow of the dialogue. This supportative atmosphere was built up by this chain and another one that was analysed elsewhere (Giordan, 2004).

In structural terms, the simultaneous occurrence of different chains made-up of IRF exchanges is the peculiar feature identified in this episode. Since each utterance was found to be part of different IRF exchanges, and these exchanges were found to be spread over the whole interaction, we suggest that the flow of the dialogue was constructed through the interweaving of these chains, whose purposes were negotiated by student and tutor who used their utterances as a multifunctional unit of communication.

As has been extensively reported, IRF exchanges can be used by the teacher as an instrument to control the classroom activities (Edwards and Mercer, 1987; Lemke, 1990; Cazden, 2001). Some studies showed that students can reverse the exchange (Wells, 1993; Hall, 1998; Candela, 1999) through taking the turn of initiation, which is an evidence that the structure of classroom activities might not be wholly determined by the control that the teacher exerts over the flow of the interactions. This implies that this control is not as rigid as has been thought.

The contribution of this study is to provide evidence of the potentially subversive character of the interactions performed by students and teachers using electronic media, in terms of the structure of activities. A particular feature of tutoring through internet services is to encourage students to initiate the interaction which changes the structure of the IRF exchanges. This confirms what has been previously reported (Cazden, 2001, p. 129), but it also allows the student to propose the agenda for the interaction, in which lies a real opportunity to consider the students' needs expressed in their own voices. That is a qualitative change in the nature of the actions performed by students and teachers which seems a consequence of the introduction and the way of using e-mail as a cultural tool (Wertsch, 2002). The simultaneous and interwoven occurrence of chains built-up by IRF exchanges, characteristic of e-mail communication, was a salient structural aspect observed in this dialogue. More investigation is needed to understand how this and other unique characteristics of e-mail use might transform the nature of teaching and learning dialogues and the way meaning is constructed in educational settings.

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