

Styles and sequences of cooperative interaction in fixed and reciprocal peer tutoring

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Abstract

The research presented here analyzes the process of interaction in pairs of students, organized into fixed and reciprocal tutoring, in an authentic written composition task. Analysis of the interactivity, or joint activity, highlights the emergence of two different patterns: the tutor's active pattern and the tutee's reactive pattern, as well as different styles of cooperative interactions, depending on the role (tutors tend to monopolize co-operation tutorials and the tutee tend to do so in collaborative sessions) and type of tutoring, reciprocal tutoring being that which best combines collaboration and tutorial. Finally, a sequential analysis allows for the identification of three types of sequences (collaborative, tutorial and the prototypical initiation–response–feedback sequence) that govern the exchanges in the tutorial situations analyzed and that locate cooperation as its central core.

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1. Introduction

1.1. Peer learning

In spite of the fact that the traditional school attempted to minimize, if not eliminate, peer interactions considering that they disturbed learning, the diffusion of the constructivist conception of teaching and learning has given such interactions educational value. Maintaining that students construct their knowledge, using an interactive process and thanks to the assistance of the mediator, peer interactions suggest that, in certain circumstances, students may adopt the role of mediator, converting their exchanges into learning opportunities.

Starting from the importance granted to the interaction both by genetic and sociocultural theory, we find attempts to articulate theoretical integration schemes for peer learning (Granott, 1993; Murray, 2001; Slavin, 1996) which, in spite of their efforts, have not managed to constitute unitary conceptual frameworks. Nevertheless, there are certain elements that may be of help in this context. On the one hand, of special value are the contributions from social constructivism, which situate the negotiation of meaning through dialogic interaction as the preferential interiorization mechanism of shared knowledge. Students learn (or co-construct) through a process of scaffolding assistance provided by their companions.

But this co-construction of knowledge is not produced spontaneously, as is explained by the positions that we have called dualist (Monereo, 1995), and which conceive knowledge as being linked to the subjective world of the student. From our point of view, teachers pre-structure knowledge when they take curricular decisions (defining objectives, selecting content, proposing activities) and, above all, when they offer the students a structure that guides interaction. The co-construction of knowledge, which the students carry out using the interaction generated within the framework supplied by the teacher, will conclude with the internalization of knowledge, which is useful for different problems that the students must solve individually.

Peer-mediated learning receives different names according to the aspect that the authors may wish to stress. Thus, apart from the term “cooperative learning”, the most traditional term in the scientific community, we find other names such as Peer-Mediated Instruction and Intervention (King-Sears, 2001) or Peer-Assisted Learning (Topping & Ehly, 1998). There are authors (O'Donnell & King, 1999) who prefer to use the term *collaboration* as a general concept and others (Kneser & Ploetzner, 2001) who still distinguish between *cooperation* and *collaboration*.

In our case, as reference, we start from the well-known distinction which Damon and Phelps (1989) made of the dimensions of peer educational interactions, characterizing *tutoring*, *cooperation* and *collaboration* by their ascending degree of symmetry and mutuality. The complementary contributions of McCarthy and McMahon (1992), comparing the three dimensions with the concept of learning, zone of proximal development and discourse, help us to conceive cooperation as the central space within this *continuum* which, in educational practice, shares characteristics with both dimensions. Because of this, we opt for the use of *cooperation* or

cooperative learning as an umbrella term for the remaining peer-learning situations, including tutoring and collaboration. Indeed, the conditions which convert group activity into cooperation (Johnson, Johnson, & Holubec, 1994), and which guide the methods of cooperative learning, are applicable to peer learning as a whole.

Equally generalizable for peer learning as a whole, and emphasized by certain authors (Fernández & Melero, 1995), is the passing from a first generation of studies on cooperative learning (which designs and analyzes the effects of cooperative learning methods, often by means of test–retest designs), to a second generation which attempts to identify the causes and mechanism of the positive results of this cooperation. For this new type of research, attention needs to be given to the process, that is, to the models of interaction between students. According to Hogan and Tudge (1999), attention should be given to the microgenetic factors, processes and contexts of historical formation; to semiotic mediation, through the analysis of interaction; and to the exploration of socio-emotional factors.

1.2. Peer tutoring

In accordance with what has been stated, we define peer tutoring as a method of cooperative learning, based on the creation of pairs of students, with an asymmetrical relation and a common, known and shared objective which is achieved through an externally planned framework (Monereo & Duran, 2002). Although peer tutoring, as a cooperative learning method, admits a varied range of possibilities in the classroom, we are going to focus on the two aspects that have aroused greatest interest: the ages within the pairing and role continuity.

The difference of age between the components of the pair gives rise to tutoring known as cross-age, without doubt the most common type in school practices, due to the fact that it approaches the widespread conception that associates the tutor student with the figure of the teacher. However, the available studies indicate that, rather than the difference in age, the important factor is the difference in aptitudes between the tutor and the tutee (Verba & Winnykamen, 1992). This reasoning may have contributed to the spread of the experience of peer tutoring of the same age or same course, known as same-age tutoring. Duran and Gauvain (1993), comparing diads of students having different ages with others of the same age, conclude that the most effective diads are those composed of students of the same age, but with different levels of skills.

However, not only is the difference of age questioned. Some authors (Daiute & Dalton, 1993) doubt that we can speak of expert students. According to them, what permits development is the very fact of having a companion with whom to dialogue and exchange points of views. This pre-eminence of interaction is shared by King, Staffieri, and Adelgais (1998), who sustain that scaffolding learning should not be restricted to pairs having a more competent component. Students of similar skills and age may help each other mutually, if they are offered the structure within which to do so. The requirement is that students learn to dominate the structured interaction format, which the teacher offers them. If they show themselves to be competent in the process of assistance, it is possible that they can then use these skills

to promote the learning of given curricular content, without the prior need of being experts in such content.

The continuity of the role of the tutor or tutee may give rise to two types of tutoring: fixed and reciprocal. The first of these is certainly the most well known. Reciprocal tutoring has more recent origins, linked to the spread of same-age practices, and was originally developed by Fantuzzo, King, and Heller (1992). Perhaps because of this, the explanatory mechanisms of its effectiveness have not been greatly investigated (Fantuzzo & Ginsburg-Block, 1998) and its potential superiority with respect to fixed tutoring has still to be demonstrated (Griffin & Griffin, 1997; Sutherland & Topping, 1999).

In spite of this, due to its hypothetical superiority, the interest in reciprocal tutoring is increasing (Greenwood et al., 2001; King, 1998). On the one hand, it may be that reciprocal tutoring extends the advantages of fixed tutoring to both members of the pair and reduces disadvantages (authoritarianism, dependence on the tutor, transmissive model of knowledge). And at the same time, reciprocal tutoring may incorporate the advantages of peer collaboration (greater symmetry, mutuality and negotiation of knowledge), reducing its disadvantages, such as the avoidance of the role of the mediator or the risk of regression in the case of the competent student.

1.3. Tutoring, paired writing and regulation through language

The complexity of the writing process, with all its cognitive demands, may produce an overload in the novice writer and make it impossible to simultaneously process all the necessary information. In fact, group or pair work allows a distribution of tasks, so that monitoring of the composition strategies lies with the tutor student. Group writing demands the need to be explicit and to make conscious and well-argued decisions about the procedures to be used; it stimulates reflection, strengthened by the existence of an audience; and it creates the need to respond to the questions and challenges of one's companions (Camps, 1994).

In order to structure the interaction between students who compose texts in a peer-tutoring situation, Topping created Paired Writing, a method of cooperative writing that combines metacognitive reflection with social interaction (Yarrow & Topping, 2001). Despite the fact that the model suggests steps, these should not be understood as components of a lineal or sequential process. It is, rather, a question of phases, which are repeatedly taken up and which help the students to be aware of composition strategies. The division of the writing process into temporarily independent phases is a method indicated by many authors for reducing cognitive overload and for making it possible to teach the writing process.

Research into Paired Writing (such as that by Nixon & Topping, 2001) uses pre- and post-test statistical analysis, as well as questionnaires and product analysis. It may be interesting, as we shall consider, to resort to interaction analysis within the pairs to gain a better understanding of the processes that underlie tutorial writing.

The interactive process and regulation through language is an element, as we have indicated, which is essential for understanding the joint construction of knowledge between peers. But while the teacher–student interaction has been

studied, exchanges between students who cooperate is a subject that has not been overly developed by socio-cultural research (Mercer, 1996). In this sense, one of the most representative works of educational discourse comes from the contributions of Sinclair and Coulthard (1975), who described the IRF exchange structure as the basic interaction structure in the classroom. In its prototypical form, the IRF three-part discourse has three phases: an initiation (I), generally in the form of a question formulated by the teacher; a response (R) from a student in reaction to the previous question; and a feedback (F) from the teacher to the student's response.

Wells (1999) maintains that the IRF exchange pattern can be used with very different objectives. When the third component of the structure (F) approaches monitoring or feedback, the IRF sequence can be considered as the prototypical action structure for achieving the global objectives of education.

However, within the sphere of peer interactions, different authors (Graesser, Bowers, Hacker, & Person, 1997; Person & Graesser, 1999) coincide in defending the fact that dialogue between tutor and tutee passes from a structure of three phases (IRF) to one of five (IRFCE), with the addition of the collaboration between tutor and tutee improving the tutor's response to (C) and evaluation of response comprehension (E). The fourth step, which the authors call collaboration, is indicated as being the central core of tutoring and that which explains its advantages. The pedagogical strategies implemented during this phase of the interaction are responsible for the advantages of this method compared to other forms of learning. The one-to-one relation means that the tutor is able to practice forms of conversation that are simply not available to the teacher involved in looking after the classroom.

It is therefore advisable to gain a fuller insight into the different forms of conversation which take place while the students cooperate. To do this, we will take as reference the interactivity or joint activity analysis model (Coll et al., 1995) which adopts the didactic sequence (process of teaching and learning in miniature) as the basic unit of observation and analysis. We will also differentiate between two levels of analysis: that of the segments of interactivity (units of joint activity that include a group of consecutive messages) and that of the messages (semiotic processes involved in the negotiation and construction of shared messages).

1.4. Aims of the study

Seeking to position the research within the so-called second generation of studies on cooperative learning and, consequently, to pay attention to the process of interaction within the pairs organized in different types of tutoring in a textual-production task, our intention is to provide answers to three types of questions, according to the different analyses and units.

- (i) The first type of question refers to the segments of interactivity that organize the construction of shared knowledge between the tutor and tutee during the process of textual production. Is any relation established in the quantity and

- type of messages generated in each segment of interactivity and, if so, does this relation differ depending on the type of tutoring – fixed or reciprocal?
- (ii) The second type of question is centered on the analysis of the messages that the tutor and tutee exchange in the interactive process. Is there a predominance of a certain type of message in the tutoring session analyzed and, if so, are differences observed according to the type of tutoring – fixed or reciprocal?
 - (iii) The third type concerns the sequential analysis or temporal distribution of the different types of messages. Does the analysis of the interactivity of these pairs lead to the emergence of a sequence of exchanges closer to peer tutoring than to the IRF pattern, commonly accepted for teacher–student exchanges?

2. Method

This study is concerned with identifying the responsible causes and mechanisms in peer tutoring and, therefore, attention is given to the interaction models between the students. To do this, the microgenetic study used combines an analysis of interactivity and sequential analysis, statistical techniques by which to reveal relationships, associations or sequential dependencies between units of conduct (Bakeman & Quera, 1995).

2.1. Observation situations

An approach that was ecological, methodological and contextualized, was chosen; this was concerned with authentic tasks and with situations of sufficient duration for the students to learn to adjust to their respective roles (of tutor and tutee).

Our information is drawn from two recorded sessions, and more specifically, from that part of the sessions in which students are jointly required to produce a text. These sessions, in turn, form part of an optional subject based on peer tutoring, which has been held regularly in a public secondary school. The subject is based on teaching and learning Catalan and has a total duration of 35 h, distributed over three classes per week, throughout a term.

2.2. Participants

The participants were 24 students, from obligatory secondary education, with a mean age of 14. Subject choice and student selection was made in accordance with the center's usual procedures, and consequently, the students enrolled reflect typical course variation, namely, a mixture of brighter students along with students having clear difficulties in written composition.

2.3. Procedure

During the first three sessions, students receive initial training in the principles of peer tutoring, an overview of the tasks required of each role, and the instruments that they will use. Their knowledge of Catalan is also assessed by means of tests developed by the Catalan government.

On the basis of the test results, two equivalent groups are created with 12 students in each. Once the students were ranked according to the mark obtained, they were alternatively assigned to each group. Each group was then assigned a type of tutoring (fixed or reciprocal) at random. In fixed tutoring (FT), the pairs formed maintained relative distance of ability in Catalan. In other words, the student ranking was divided into two lists and students were then paired in strict order (the first student in the first list with the first student in the second list, and so on successively). In reciprocal tutoring (RT), however, students were paired according to the result obtained (first with second; third with fourth, etc.), in such a way that the distance between level of ability in each pair was minimum.

Once the subject was underway, an audio recording was made of four sessions distributed over the term. The information from the second and fourth of these sessions has been taken into consideration in this study (the other sessions were for student familiarisation). The section in which students jointly produce a text has been taken as the didactic sequence from each session. The protocol for the study of the interaction consists of the audio recording of the pair's conversation, the transcription, the textual production (draft and best copy), teacher's observations and an individual post-recording report for each student.

At the end of the term, the students' ability in Catalan is once again evaluated with a test parallel to the initial assessment, in order to determine whether the students have improved their level of curricular knowledge.

2.4. Material

In the two sessions analyzed, the usual work procedure in the subject was followed. In the previous class, the tutor students had been given the "Activity Sheet", which contained a brief text, comprehension questions about the text and a written-expression exercise, which had to do with the text read. In the first session, the students had to write a brief story imagining what the most dejected pauper would do if he were king for a day. In the second session analyzed, the students were asked to write a review about a book, film or musical CD that they had read, seen or heard.

To help in the composition process, students were given (if they needed it) an adaptation of the *Paired Writing Flowchart* by Keith Topping. In any case, the students knew that the steps described in this flowchart (generation of ideas, drafting, reading, editing, best copy and assessment) are simply guidelines and that writing is not a lineal process, sequenced in steps.

2.5. Data analysis

Following the interactivity analysis model developed by Coll and collaborators, the joint activity of textual production for each section was adopted as the didactic sequence, since it has an objective (the text-elaboration problem), an activity (the paired writing model) and an evaluation (self-assessment in pairs). This part of the recorded session has, therefore, a beginning and an end and, as a didactic sequence, forms a basic unity of observation, recording, analysis and interpretation.

With respect to interactivity, we will distinguish between two levels of analysis. The first one of these, more macro or molar, seeks to identify the segments of interactivity or changes in the way in which the joint activity is organized within the didactic sequence. The fact that the didactic sequence takes textual production as its objective and that, in addition, it provides a suggested procedure via guidelines, suggests that the categories will very probably include the different steps set out in such a guideline model.

The second level of analysis, certainly the most interesting one for the purpose of this work, refers to the semiotic processes involved in the negotiation and construction of shared meaning. This is a finer analysis that takes the message as the basic unit: one of the students' expression, which in itself has a meaning, within the pair's joint activity.

The system of categories for each of these two levels of analysis will follow the criteria of mutual exhaustiveness and exclusivity and should emerge from the theory, but defined situationally or post hoc, in accordance with constructivist approaches (Coll, 1998) and the consolidated proposals of peer interaction analysis (Kumpulainen & Wray, 2002).

In order to guarantee a greater degree of objectivity in the system of categories, especially those referring to the second level of analysis, two external observers analyzed a sample of 20% of the total sessions. From the results obtained, the Kappa coefficient was obtained (Cohen, 1960), especially created for nominal scales, with the aim of ensuring the reliability of the proposed categories.

Finally, we will use a sequential analysis in order to see how message configurations are developed over time so as to obtain the basic statistical information that makes it possible to describe the forms taken by the interactions within the pairs. The sequential analysis will allow us to see the probability of chained events within the categories observed, which will facilitate a determination of whether specific message configurations activate or inhibit others and whether, as a result, there is a sequential pattern for student-to-student interaction in the studied tutorial situations.

3. Results

Before presenting the results obtained, we will comment on three previous aspects constituting elements of control: the equivalence of the two groups designed (fixed

and reciprocal tutoring), increase in linguistic skill and the reliability of the category system used.

With respect to the first question, in considering the individuals assigned to the fixed tutoring (FT) and reciprocal tutoring (RT) as two independent samples, the Leven test was applied for variance equality. With an average of 54.17 and a deviation of 19.94 for the FT group, and an average of 52.08 and a deviation of 20.11 for the RT group, we obtain significance of 0.947, greater than the 0.05 needed for statistical significance. Variances are therefore assumed as equal and, consequently, the groups are deemed as being equivalent in their knowledge of Catalan.

The results obtained in the test and re-test application of the Catalan language test, with an average of 53.13 and a deviation of 19.61 for the test situation, and an average of 74.58 and a deviation of 17.52 for the re-test situation, produce a bilateral significance of 0.000, which shows that the difference is statistically significant (for a confidence level of 95%). However, the results find no difference that is statistically significant for re-test between the fix tutoring group (with an average of 76.67 and a deviation of 16.23) and the reciprocal tutoring group (72.50 and 19.21).

Finally, the reliability of the category system identified for each level of analysis was checked through calculating Cohen's Kappa coefficient, for two external observers. 0.946 was obtained in the first; 0.896 on the second. The level of agreement between each observer and researcher, from which the coefficient subtracts what may be due to random, is well over the 0.7 considered necessary to exceed.

3.1. First level of analysis. Segments of interactivity

The resulting system of categories, summarized in Table 1, is essentially based on the phases of the paired writing-model, in spite of the fact that it is not compulsory, the steps are not lineal (as has been observed) and it is not always fully completed by the pairs.

Since this level of analysis is concerned with the relation between the segments of interactivity (SI) and the messages, depending upon the type of tutoring and session, we will synthetically present the distribution of messages according to the different SI, as shown in Fig. 1.

The *generation of ideas* segment agglutinates 19.18% of the total messages. This considerable figure appears to be in agreement with the idea expressed by many

Table 1
Synthesis of the system of categories for the first level of analysis

1. Ideas	Generation of ideas for the writing of the text.
2. Drafting	Provisional writing of the text.
3. Reading	Reading of the draft to get a grasp of the text as a whole and the result.
4. Editing	Predisposition to improve the text with the appropriate corrections.
5. Best copy	Final writing of the text.
6. Evaluate	Self-assessment in pairs of the product (text) and the process.
7. Inquiries	Requesting assistance from the teacher to achieve the academic objective.
8. Outside task	Leaving the joint activity of textual production.

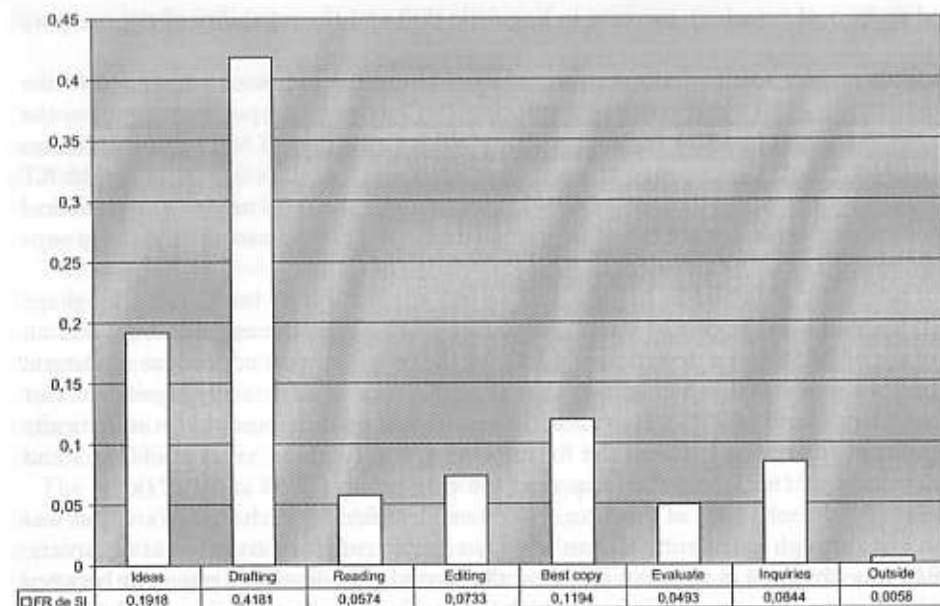


Fig. 1. Relative frequencies of the distribution of messages according to the segments of interactivity.

authors that paired writing requires specification of the different steps and the negotiation of the meaning (both of the objective and procedure) that will guide the joint performance. Tutoring obliges the students to make explicit what in individual work would be implicit and would not be given much thought. This fact is reinforced by the increase observed in the second session.

However, from the message distribution according to SI, what is most striking is the large quantity of messages within the segment of *draft writing* (41.81%). This result is explained by the fact that the pairs often launch into provisional writing without having sufficiently defined their ideas, which are generated, or re-defined, as they write the draft. We see an example of this in the following excerpt (fixed tutoring, pair 1, session 1, 69–83):

Tutor: Be poor than die. No, rather be poor, you have to rub that out.

Tutee: Rather be poor...

Tutor: Than die, OK? Than die. Mmm...What else can we put...

Tutee: Mmm...

Tutor: Mmm...How can we, how can we, how can we explain that this, that he thought it and that...

Tutee: The paup...The pauper thought about it and...

Tutor: No, but we have to write, we have to write what he's thinking. Or we can make the magician say to him: but look at your life now, it isn't...it isn't miserable and unhappy

Tutee: Yes, but, as, no as he believed in God before, he would think that he'd go to Heaven. In the Middle Ages... that's why it says remember, also remember that we're in the Middle Ages.

Tutor: Yes, yes.

Tutee: I suppose so, don't you?

Tutor: Yes, yes.

Tutee: And so he'd think that he'd go with whoever to Heaven and then...

Tutor: Then...

Tutee: He said yes.

Tutor: Mmm, then the magician can say to him: but look at your life now, it isn't, it isn't miserable and unhappy, it isn't in Heaven where, where there is true happiness. Put that/. But the astute, the astute magician, magician said to him, colon.

Nevertheless, the draft segment not only includes messages typical of the generation of ideas, it also includes others which are characteristic of reading and editing, because the students decide to go through and read the provisional text section by section, as they are writing it, or to correct it as they go along. But in no case do the students specify a change of segment; rather, they carry out these activities that are typical of drafting. This inclusion of activities characteristic of reading and editing within the drafting segment not only explains the low proportion of messages within these two segments but also the low frequency of messages in the *best copy* segment (11.94%), when the students are finishing off the draft.

The *evaluation* segment also obtains a low frequency of messages (4.93%), partly because it is placed at the end of the session and is not reached by some of the pairs. The fact that most of them pass through it with few communicative exchanges, and often mechanically following the suggestions contained in the models (referring strictly to the quality of the text and very little to the work process) suggests that self-assessment in pairs is not traditionally practiced between students and that it is, most certainly, a skill to be developed.

Taking into account that, for the interests of this study, the tutoring situations analyzed are based on the pairs' autonomous work and that during the recordings the teacher only intervened at the students' request, the high frequency of *inquiry messages* directed at the teacher (8.44%) may be surprising. This not only proves the importance of the teacher's assistance, but also, as the transcriptions demonstrate, highlights the possibility that tutoring offers, in the sense that individual assistance is given immediately.

Lastly, the small number of messages in the *outside of task* segment (0.58%) suggests that the effective work time in tutoring systems is high. Nor indeed were virtually any discipline problems, these being regulated by the students themselves.

3.2. Second level of analysis. Message configurations

The system of categories used in this second level of analysis is based on the structure of interaction that Person and Graesser (1999) suggested for tutorial

exchanges, and which broadens the classic IRF structure, adding collaboration and evaluation. Within collaboration (which in accordance with our theoretical framework we prefer to call cooperation), we have identified certain categories, some coinciding with these authors, which we can group in two blocks. As Table 2 shows, the message configurations of *Question Cooperation* (Qc) and *Splicing Cooperation* (Sc) correspond to forms of collaborative cooperation: these are characterized by the symmetry or mutuality between the participants and by the shared and negotiated construction of knowledge. In its turn, *Hinting Cooperation* (Hc) and *Guided Cooperation* (Gc) are forms of tutorial cooperation: characterized by the asymmetry of exchange and by assistance in the form of scaffolding.

Most of the interaction, which is produced within the pairs during the tutoring sessions analyzed, is of a cooperative type. As we summarize in Table 3, 81.58% of the messages are cooperative. To be more precise, 50.42% are of a collaborative cooperation type and 31.16% are tutorial cooperation. Taken as a whole, the interactions prevailing in peer tutoring are therefore cooperative and collaborative.

In addition, it can be seen that the *Response* messages (3.53%) do not coincide with those of the *Initiation* (4.99%). This fact, which we will analyze later, suggests that the tutorial-interaction structure predisposes the tutee to skip the response message and pass directly on to cooperative messages that, with the tutor's help, enables the construction of a joint response. An example of this can be seen in the following excerpt (reciprocal tutoring, pair 3, session 1, 15–18):

Tutor: Come on, let's get started.

Tutee: OK. How shall we start?

Tutor: I don't know, as if you were the poor man, now, what would you put down, Mmmm...the day // That's it, what you can do is something like a personal

Table 2
Synthesis of the system of categories for the second level of analysis

Initiation (I): joint activity that initiates a SI (explanation, exemplification or formulation of a problem or challenge...)

Response (R): answer, complete or not, to the demand formulated in the Initiation

Feedback (F): evaluative information about the Response or about a Cooperation message.

Cooperation Collaborative *Question C. (Qc)*: invitation to the companion to offer an unknown answer (to cooperate in solving the problem).
Splicing C. (Sc): unite or adapt new information to that of the companion to make its content significant.

Tutorial *Hinting C. (Hc)*: assistance (hints, elimination, insinuations...) so that the companion finds the answer for himself.
Guided C. (Gc): guidance for the teaching and learning process (situate in the process, sequence, non-requested correction...).

Evaluation (E): assessment of the performance of the pair, or of a member of it, according to the results of the finished SI or of the didactic sequence in general.

Parenthesis (P): activities situated outside the joint activity for achieving the objectives of each SI.

Table 3
Frequencies of the message configurations

Categories	Absolute frequencies	Relative frequencies
Initiation	154	0.0499
Response	109	0.0353
Feedback	186	0.0604
Question C.	393	0.1273
Splicing C.	1164	0.3769
Hinting C.	289	0.0936
Guided C.	673	0.2180
Evaluation	63	0.0204
Parenthesis	49	0.0159

diary, but for that day, OK? But you, how would you write it down? // Today is the happiest day of my life, right? /Today, o, y, no rub that out, o // today is the happiest day of my life, OK? // is the, OK? // happiest, no, with two "p"s, happiest...

Tutee: i?

If we observe the frequency of the message categories, according to the student role (tutor and tutee), as shown in Table 4, we will observe important differences of behavior, as was to be expected.

The predominance of certain message configurations seems to be distributed according to the role adopted by the students. In this way, the *Initiation*, *Feedback* and tutorial type cooperation (Hc and Gc) would correspond to the tutors, while the tutees would assume the *Response*, collaborative cooperation (Qc and Sc) and *Evaluation*. Two types of pattern therefore seem to emerge: that of the tutor, more active in character, leading the initiative so as to develop the didactic sequence; and that of the tutee, more reactive in nature, responding to the tutor's actions.

If we pay attention now to what appears to be the responsible core of the tutoring, the cooperative messages, and in addition to the student role, we also distinguish the type of tutoring – fixed or reciprocal – in which the role is developed (as shown in Table 5), we will observe, first, the reversal produced with respect to the results shown by the tutors in the *splicing cooperation* and *guided cooperation* messages. The

Table 4
Frequencies of message configurations according to the student role

Categories	Tutors		Tutees	
Initiation	129	0.0507	41	0.0164
Response	9	0.0035	56	0.0224
Feedback	144	0.0566	69	0.0276
Question C.	112	0.0440	299	0.1194
Splicing C.	1198	0.4705	1722	0.6877
Hinting C.	242	0.0951	24	0.0096
Guided C.	604	0.2372	155	0.0619
Evaluation	47	0.0185	55	0.0220
Parenthesis	61	0.0240	83	0.0331

Table 5
Absolute and relative frequencies of cooperative messages according to role and tutoring

Categories	Fixed tutors	Reciprocal tutors	Fixed tutees	Reciprocal tutees
Question C.	49 (0.0446)	63 (0.0435)	104 (0.0983)	195 (0.1349)
Splicing C.	445 (0.4053)	753 (0.5200)	805 (0.7609)	917 (0.6342)
Hinting C.	98 (0.0893)	144 (0.0994)	3 (0.0028)	21 (0.0145)
Guided C.	339 (0.3087)	265 (0.1830)	23 (0.0217)	132 (0.0913)

first of these predominates among the reciprocal tutors, while the second predominates among the fixed tutors. If we group the cooperative messages according to their collaborative or tutorial character, we can see that collaborative cooperation predominates among reciprocal tutors (with 56.35%, compared with 44.99% for the fixed), while tutorial cooperation is more characteristic of the fixed tutors (with 39.80%, compared to 28.24% for the reciprocal).

If we observe the differences between the tutee students, we will see that in spite of the small proportion of tutorial cooperation messages, these are produced basically by the reciprocal tutees. Thus, the tutorial cooperation messages account for 10.58% of the total reciprocal tutees, while this is reduced to 2.45% for the fixed. The following excerpt provides an example of how the tutee carries out guided cooperation actions and assumes a role generally reserved for the tutor (reciprocal tutoring, pair 2, session 2, 278–290):

- Tutee: Right, we have to give it a mark and write it out neatly // one, two, three, four, five, I've improved, haven't I? / Right, let's see, paper, which paper? Paired writing paper. "Tutor: Is it clear what the purpose is and who it is addressed to?"
- Tutor: Mmm. yes
- Tutee: Is it clear that it's for the people?
- Tutor: Yes, very clear.
- Tutee: And that the purpose is, Mmm...a review, well, no, giving an opinion, giving an opinion about a record. Let's see, you have to give it a mark, well, between the two of us, a four, yes, I think so too / A four: "Is the content clear and ordered?"
- Tutor: Yes, yes (laughs).
- Tutee: Right, we've been putting it in order bit by bit and, it's OK. I think it's the text we've been more...mutual ideas.
- Tutor: Yes.
- Tutee: Don't you think so?
- Tutor: We've done it well.
- Tutee: "Are the phrases well-constructed, connected and ordered?" Wait...
- Tutor: Yes.
- Tutee: Let's look at them.

Frequency in the cooperative configurations of the fixed tutees (together with other facts, such as the absence of *Initiation* messages) reaffirms these in the

traditional role of student or, if preferred, views them as being in keeping with the reactive pattern mentioned earlier.

In short, if we were to rank the students according to the role and type of tutoring, in accordance with their proportion of cooperative messages of a collaborative and tutorial type, we would obtain a graph such as that shown in Fig. 2, which – for tutorial cooperation – would show the fixed tutors (FT) in first place, followed by the reciprocal tutors (RT), the reciprocal tutees (rt) and the fixed tutees (ft). The order is exactly the opposite for collaborative cooperation.

This suggests that there is a relation, in the tutorial situations studied, between the role within each type of tutoring and the style of cooperative interaction developed. An interactive tutorial style can be seen in the fixed tutoring, characterized by the asymmetrical relation between the tutor (who carries out the tutorial cooperation) and tutee (who assumes the collaborative cooperation), while in the reciprocal tutoring, the interactions tend towards a greater symmetry and mutuality between both participants.

3.3. Inductive sequential analysis

With the aim of finding an interaction sequence for peer tutoring closer than the classic IRF, we present the results of a sequential analysis that, taken with certain precaution because of the reduced character of the data, produces the results summarized in Table 6.

The columns detail previous behavior; rows show that which was immediately subsequent. Positive values greater than or equal to 1.96 suggest that the previous behavior activates the subsequent, constituting a pattern of activation. The activation patterns obtained can be represented on a delay graph (see Fig. 3). In this, previous and subsequent activated behavior are joined by arrows. Indicated above the arrow is the probability of transition and, for greater expression, an attempt has been made to represent such probability by arrow thickness.

As can be seen on the graph, the probability of transition frequencies between each component of the interaction in the peer tutorials analyzed highlights three differentiated itineraries.

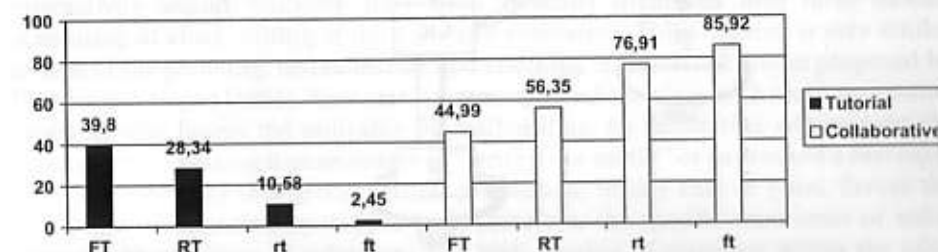


Fig. 2. Ranking of the proportions of tutorial and collaborative messages according to role and tutoring.

Table 6
Adjusted residues for delay 1

	I	R	F	Qc	Sc	Hc	Gc	E
I	13.47	42.25	-2.38	2.13	-12.81	-2.14	-2.10	-0.20
R	9.40	-1.53	7.62	-0.93	-5.53	-0.77	2.99	-0.78
F	-1.30	0.71	7.99	1.95	-2.98	-1.76	-0.82	-0.14
Qc	0.46	-2.50	-1.30	-0.56	0.06	1.96	1.47	-1.67
Sc	-5.11	-10.44	0.58	-3.50	3.42	7.81	2.64	-11.04
Hc	-1.53	-2.60	-3.71	-0.18	10.52	-4.25	-6.80	-2.52
Gc	-1.71	-2.28	-3.05	4.30	1.77	-6.09	-1.97	8.22
E	-0.88	-1.49	-1.62	-1.90	-8.00	-2.44	5.01	26.67

1. ICE sequence or collaborative structure. After the tutor's *Initiation* message (I), and starting from a *Question* cooperation (Qc) from the tutee, both students enter into a series of cooperative exchanges to jointly construct the response, which will end through the tutor's *Guided* cooperation (Gc), giving way to the *Evaluation* (E). This sequence could be represented as I–Qc–Hc–Sc(Hc–Sc)–Gc–E.
2. IRCE sequence or tutorial structure. The tutor's *Initiation* (I) is followed by a *Response* from the tutee (R) that, by means of a *Guided* cooperation from the tutor (Gc), is improved through a loop of cooperative exchanges that end, once again, with the tutor's *Guided* cooperation (Gc) and *Evaluation* (E). It is the tutor

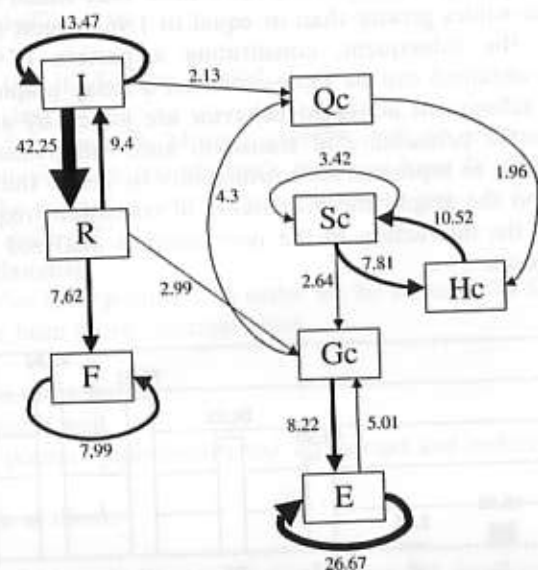


Fig. 3. Transition graph of delay 1 for the message configurations.

who opens and closes the cooperative exchanges. This sequence could be represented I–R–Gc–(Qc)–Hc–Sc(Hc–Sc)–Gc–E.

3. IRF sequence or prototypical structure. The three-part dialogue is also present in peer tutoring. In numerous episodes, the pairs of students follow a form of dialogue similar to that of the teacher in the classroom. The tutor makes the *Initiation* (I) through multiple forms (explaining, exemplifying, formulating a problem, question or challenge...). The tutee *responds* (R) to the demand and the tutor then offers *feedback* (F), assessing the correction of the response, whether in the ambit of content or of relation.

The tutorial sequence (IRCE) is probably concerned with fixed tutoring, while the collaborative sequence (ICE) may be more characteristic of reciprocal tutoring. Both may share the IRF sequence, when the simplicity of the proposed activity (I) generates a response (R) from the tutee that is sufficiently complete to be assessed in the form of feedback (F) by the tutor.

4. Discussion and conclusions

The statistically significant difference in the test and re-test application of the language skill test is of great interest from our point of view since it stresses the instructional character of peer tutoring. Often, due to the fact that for a considerable time research into peer learning was directed at the study of its influence on socialization, many teachers have regarded cooperative learning as something useful for content related to attitudes, but to a certain degree undervalued when compared to other aspects regarded as central to the subjects. We believe that demonstrating that students learn the contents characteristic of the subject through cooperation, in this case through tutorial relations, is of great value in combating this prejudice. And this may help in its incorporation into the instructive strategies employed by teachers and teaching centres.

With respect to what we have called the first level of analysis, that referring to the segments of the interactivity of the pairs during the task of textual production, the over-dominance of *draft editing* can be explained, as the results suggest, by its agglutinating role and by the fact that it includes messages typical of other segments. If the model used for paired writing had not suggested the best copy, the segments of interactivity would probably have been basically organized into three blocks: generation of ideas, editing of the draft and evaluation. This structure is very similar to that of the planning, textualization and checking of the classic model proposed by Flower and Hayes (1981). Students' increasing familiarization with word processors probably also favors the centrality of draft editing, by facilitating editing over the process and by making it unnecessary to "write it out neatly" or to produce a *best copy*.

It has been said that group textual production, in this case in pairs, favors the emergence of cognitive operations and, therefore, the specific experience of using language as an object of reflection. The high number of messages within the *ideas generation* segment corroborates this notion. According to studies deriving from the

models of Scardamalia and Bereiter (1992), the emergence of planning, as an activity separate from production or editing, constitutes the most important moment in the development of writing skills, since it is that which makes it possible to pass from the model of “stating knowledge” (following the models of oral discourse) to the model of “transforming knowledge”.

It has been noted that classroom management using the principles of peer tutoring enables the teacher to give immediate assistance to the student or pair requesting it. It goes without saying that the impossibility of giving attention to all students, of attending them individually or giving them assistance when they request it, constitutes one of the main sources of dissatisfaction in traditional classroom management.

The reduction in management time (with each student aware of the work process and the responsibilities that accompany their role), the high level of effective work time (dedicated to achieving the specific academic objective in question) and the high percentage of success (because of permanent monitoring by the tutor student) leads to a high rate of Academic Learning Time (Greenwood, Carta, & Kamps, 1990). We understand that the very few messages within the *Outside the Task* segment demonstrates this and can help to combat an apparent loss of control in the classroom, which some teachers fear when using cooperative learning methods.

With respect to the second level of analysis, that of the messages, the results show that the peer tutoring analyzed is based on a cooperative-type of interactivity (80.1% of the messages emitted). Peer tutoring is therefore a method of cooperative learning. In addition, taken as a whole, there is a predominance of interactions having the character of collaborative cooperation.

If we observe the students according to the role which they adopt within the pair, we see that tutors and tutees show an uneven predominance in the different message configurations, which suggests two different patterns according to the role: the tutor's active pattern (with a predominance of initiation, feedback and tutorial cooperation messages) and the tutee's reactive pattern (with a predominance of response and collaborative cooperation).

The results suggest that the development of the role of tutor or tutee in the fixed or reciprocal form determines the style of cooperative interaction. Although, as we have just pointed out, tutors monopolize tutorial cooperation (cooperation using hints and guided cooperation) whilst tutees dominate in collaborative cooperation (by question and splicing), reciprocal-tutoring students best combine tutoring and collaboration. We can affirm that the patterns describing the asymmetrical action of tutors and tutees (active and reactive) are somewhat blurred in the reciprocal tutoring pairs.

Yet, although the interaction of the reciprocal tutoring pairs comes closer to collaboration – and to a greater mutuality and symmetry – results in academic learning have not shown statistically significant differences between fixed and reciprocal pairs. In this sense, the results situate our study among those (already mentioned) that have not been able to demonstrate the superiority of reciprocal tutoring. In this sense, we coincide with those authors (Baudrit, 1999 or Verba & Winnykamen, 1992) who have pointed out that what is important is the establishment within the pair of a distance or heterogeneity, which may have a fixed character (the advantage is always on the side of a single student) or reciprocal character (the

advantage alternates between the students, according to the sessions, activities, etc.). In the first case, this distance between tutor and tutee may be due to a difference in age, previous training or skills. In reciprocal tutoring, however, it has to be constructed and re-constructed in each session by means of the prior preparation of the task and/or of the system of assistance and resources supplied by the teacher.

This difference in skills may be made relative if, as expressed by King, Staffieri, and Adelgais (1998), we offer the students a highly structured framework. Even true peers or students of the same age and similar skills can help each other mutually if we offer them the structure within which to do so, as seems to have been the case with the subject analyzed in this study, which opted for an externally planned and highly structured framework.

In this sense, the fact that the reciprocal tutoring students did not obtain results that were poorer than those of fixed tutoring may be sufficient reason to promote its educational use, since it probably includes certain advantages of both collaboration and tutoring, at the same time as reducing the disadvantages of both of these.

Finally, the three types of sequences identified in the tutorial situations analyzed (collaborative sequence or ICE, tutorial sequence or IRCE and the prototypical sequence IRF), lead us to emphasize the central core of peer tutoring articulated within cooperation, with its different forms, ranging from the most collaborative (asking for assistance and the joint construction of knowledge) to the most tutorial (offering assistance, using hints or guiding the teaching and learning processes). The different types of messages taking place within the core of cooperation, in the first two sequences, substitute tutor feedback (in the tutorial sequence) or tutee response and tutor feedback (in the case of collaborative sequence).

Certainly, the thought-provoking nature of this type of sequence in offering a better explanation for peer tutoring and learning processes lies in a descriptive value for the context studied, in the specific type of activity (textual production) and in the forms of exchange (tutorial structures). Logically, however, these can be modified by a change of context, and it is therefore necessary to continue research into different tasks and contexts.

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