

Paradoxical effects of feedback in international online reciprocal peer tutoring

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A b s t r a c t

This paper reports an online reciprocal peer tutoring project for improving language competence in Spanish and English. Students aged 9–12 years from Scotland and Catalonia were matched to act as tutors in their own language and as tutees in a modern foreign language. Students were intended to improve both their first language (through helping the tutee) and a modern language (with their tutor's help). The methodology combined a quasi-experimental design and a qualitative analysis of texts. For Catalan students, pre-post test results indicated statistically significant improvements in reading comprehension (while acting as tutors) and writing (while acting as tutees). Scottish students improved only their writing (acting as tutees). Analysis of the texts showed that when more support was given, the tutor had more learning opportunities, but then there were fewer opportunities for the tutee, and vice versa. Thus the tutee learned more with less elaborated feedback, leading to fewer opportunities for tutor improvement. This paradox could be resolved by adjusting the scaffolding support given by tutors, to create a balanced interactive learning context for both members of the pair.

1. Introduction

Constructivist teaching and learning perspectives (Wertsch, 1993) and communication approaches related to pragmatic language (Milian & Camps, 2006) both agree on the importance of building meaningful and authentic contexts for learning. In these, functional communication is required, with a real audience to give meaning to practices and enhance learning from reflection on them. However, traditionally schools have focused on somewhat detached exercises in spelling and syntax, rather than on using language as a practical communicative tool to achieve social purposes which can go beyond the classroom (Camps, 2003; Halliday, 1982). More recently, the progressive development and use of virtual environments (Mominó, Sigalés, & Meneses, 2008) have enabled the opening of communication between students from different countries, promoting foreign language use in authentic collaborative contexts and enhancing communication and learning by interaction among equals.

This paper provides data on reciprocal online peer tutoring which is intended to improve both Spanish and English languages through writing in a modern foreign language (L2) as tutees and correcting text in a first native language (L1) as tutors. In our multilingual contexts, for many Catalan students Spanish is not their first language, nor is English for some Scottish pupils. However, for practical purposes, we will consider Spanish and English as L1 and L2 for Catalan

students; and vice versa for the Scottish. In this project, Catalan students had the role of Spanish language tutors for Scottish students, checking their text through a virtual platform and providing support for improvement. The Scottish pupils were English language tutors for the Catalan students.

In previous research, both quantitative analysis (Thurston, Duran, Cunningham, Blanch, & Topping, 2009) and qualitative analysis (Duran, Blanch, Thurston, & Topping, 2010) showed how students who participated improved in both languages (unlike the control groups).

However, a deeper statistical analysis showed that the Spanish improved more. The substantial improvement of the Catalans as tutors showed the importance of the degree and type of assistance they offered, which was greater than that offered by the Scottish. Catalan tutors provided more scaffolded support requiring more active reflection and discussion from both the tutor and the tutee. However, further analysis was required. Thus we designed the present study, which introduced specific training for peer tutors. It has been frequently noted that initial training is linked to the quality of support tutors offer to their tutees (Cohen, Kulik, & Kulik, 1982). The objective of this research was to investigate the effects of these peer supports in improving language skills in both languages.

2. Background and brief theoretical foundation

Peer tutoring consists of people of similar social status helping others to learn and learning themselves by teaching (Topping, 2000). Online peer tutoring is peer interaction typically at a distance through Information and Communication Technology (ICT) which promotes mutual learning. In recent years, many investigations have concluded that exchanges between students from different countries can facilitate the learning of languages and knowledge building (e.g., Vinagre, 2010). The development of technological tools has been described by Godwin-Jones (2003). These include more traditional means of email, discussion forums and chat, but also more recent methods such as blogs, wikis, and RSS feeds. This has led to what has been called TPALL (Technology for Peer Assisted Language Learning), with rich and varied practices (Dehkinet & Topping, 2010).

Recent studies underscore the importance of the quality of interaction between students as one of the key issues for peer learning (Storch, 2002). It is important to organize student interactions to enhance real learning opportunities. Peer tutoring in this study is based on pairs of students playing a double asymmetrical role – both tutee and tutor, in a structured framework planned by teachers (Duran & Vidal, 2004). This way of learning is very suitable for the development of receptive and expressive language skills in both L1 and L2, the students learning through writing and revision of written texts (Duran et al., 2010). The current project is a variant of “email dialogue journaling” as described by Shang (2005), but in this case between students from different countries. It also has some similarity with “tandem learning” (Little et al., 1999; Vinagre, 2010). However, instead of using email, students used a virtual platform on which each pair exchanged their texts and their corrections.

Concerning writing in particular, several authors (Castelló, Iñesta, Pardo, Liesa, & Martínez-Fernández, 2010; Dysthe, Samar, & Westrheim, 2006; Storch, 2002) indicate that proofreading in pairs assists reflection on the writing process and improves the quality of texts, whether in first or foreign languages. This relates to, but is not part of, the current project. Collaborative review, as opposed to individual review, involves a greater degree of revision and changes in the text (Allal, 2000; Lindblom-Ylänne, Pihlajamäki, & Kotka, 2006) through viewing the text from another perspective (Yang, 2010). Again this relates to, but is not part of, the current project.

Turning to factors that are part of the current study, Cassany (2002) points out that correcting the text of other students promotes self-regulation, provides opportunities for linguistic reflection and allows the teacher to focus on the writing process. Also, writing to communicate with a partner is not the same as writing for the teacher. Several authors (Camps, 2003; Cassany, 2002; Milian, 2003) agree that the sense of audience is inherent in peer practices and that writing is a process of social interaction and negotiation of meaning between writer and reader (Nystrand, 1989; Prior, 2006). Both of these were incorporated in the training provided for participants in this study.

From a socio-cultural perspective, providing assistance within the zone of proximal development is a function of the collaboration (Wells, 1999) which underpins the effectiveness of peer review in the learning of L1, since the student who performs the tutor role (and is an expert in L1) should review the peer text and offer adjusted support including text correction to improve its quality. This process requires effort to clarify doubts and rework explanations, and is tailored by the tutor, requiring excellent tutor comprehension of the text. This supports the idea that in teaching their tutee, the tutor also learns (Cho & Cho, 2010; Cortese, 2005; Roscoe & Chi, 2007). On the other hand, the peer review also promotes L2 learning, because students acting as tutees rewrite the text based on the immediate feedback of the tutor, adapted to the tutee's needs (Min, 2006; Nelson & Schunn, 2009).

However, not all peer review is equally effective (Gibbs & Simpson, 2004; Gielen, Peeters, Dochy, Onghena, & Struyven, 2010; Nelson & Schunn, 2009). Research in this area warns of the difficulties of some students in making objective assessments of their peers (Lindblom- Ylänne et al., 2006). Social aspects between pairs, especially those related to cultural knowledge, can also impede communication (Vinagre, 2005). It is therefore necessary to take into account the quality of aid or feedback (Liang, 2010; Nelson & Schunn, 2009). A review of studies on the quality of feedback (Topping, 2010) concludes that non-directive feedback is more effective for students with high skills, whereas more elaborate feedback might be suited to students with low abilities. Consequently, it highlights the importance of prior training of the tutors (Min, 2006). In summary, there is a need on the one hand for greater effort in tutor training to provide support for linguistic reflection, and on the other to analyze the different types of feedback offered and their relation to the improvement of language competence in both languages.

In the present investigation tutors were trained to note errors and provide suggestive but not directive error correction for the tutee, who then thought about the issue, developed their own response to the problem and corrected the error themselves – hopefully learning by succeeding. Peer tutors were to avoid giving the answer or solution directly. Instead they offered assistance requiring the active participation of the tutee, such as merely marking the error or more assertively marking the error and giving a clue (by reminding, questioning, explaining or modeling). Finally, it was considered important to give encouragement to the partner for their progress and efforts in the proper use of the second language.

3. Objectives and research questions

The objective of this research was to analyze whether reciprocal peer tutoring with students from the fifth and sixth grades in Scottish and Catalan schools produced improvements in languages L1 and L2. The questions guiding the research were:

- 1 What are the effects of reciprocal peer tutoring in improving first language competence?
- 2 Can reading the text critically and providing feedback improve the learning of the first language in the tutor?

Language competence data were collected at pre- and post-test. It was expected to find statistically significant differences and understand the factors underpinning the analysis of texts and the quality of feedback offered by the tutor.

- 3 What are the effects of reciprocal peer tutoring on competence in the second language? Does writing for a peer and receiving support for correction improve second language competence? Second language competence data were collected pre- and post-test. It was expected to find statistically significant differences and understand the factors underpinning the analysis of texts and the use of feedback by the tutor.

4. Methodology

4.1. Sample

The project involved 24 sixth grade Catalan students and 20 fifth grade Scottish students. The participants' ages ranged between 9 and 12 years. Pairs of students, one from each school, were formed by matching students at similar levels of ability in L1. Each student played the role of tutor in their own language and tutee in a modern foreign language, in an online environment. Three teachers took part. In Scotland one teacher was responsible for both the Spanish and English work; while in Catalonia one teacher was responsible for the Spanish and another for the English.

4.2. Design

An approach was used that combined quantitative and qualitative methodologies. A quantitative methodology was used to determine pre-post changes in intra-subject ability in L1 and L2, and qualitative methodology was used to explore what mechanisms might have influenced these changes. We chose not to use a control group for three reasons. First, research has already frequently found that peer tutoring and cooperative learning are effective (Ginsburg-Block, Rohrbeck, & Fantuzzo, 2006; Johnson & Johnson, 2009; Roscoe & Chi, 2007). Second, the study preceding the present study used a control group and demonstrated effectiveness in the intervention group compared to the controls (Duran et al., 2010). Finally, in this case we were principally interested in the relationship between pupil outcomes and the nature of the interaction. Regarding the interactive process within pairs, we considered three variables: types of errors detected, level of feedback offered and the tutee's response to the correction of the tutor. Considering types of errors detected, errors were categorized according to morphosyntax (articles and conjunctions, punctuation, verbs, gender and number, word order, prepositions, and pronouns), spelling (according to Gómez, 2002 - letters, initials and syllables) and vocabulary (appropriate use of vocabulary). Considering level of feedback offered by the tutor, we used seven categories, each graded from the highest to lowest level: 1) Mark the error, give the correct answer and an explanation, 2) Mark the error and give the correct answer, 3) Mark the error and offer an explanation that helps the tutee to correct the error, 4) Mark the error and offer some hint(s) and prompt(s) to help the tutor to correct the error, 5) Mark the error, 6) Prompt, 7) Ask questions, and 7) Praise effort and improvement. Finally, considering the tutee's response to the correction of the tutor, we examined the text to see whether the later versions of compositions incorporated modifications in relation to the feedback received by the tutors.

4.3. Procedure

Students interacted through the virtual learning platform of the University of Dundee (Blackboard), each with an individual password. From the results of tests of language skill in their own language, matched pairs were created at similar levels of first language proficiency. The students were told that each would act as tutor of the first language to their partner. They would learn by teaching in L1. Acting as tutees, each would improve their texts and learn through the feedback received to improve L2. Each student needed to write five texts in the foreign language and improve from the corrections received, and in turn correct the messages from their partner in L1. We trained students to learn to correct the texts offering different types of feedback.

The schools worked on the project for four hours per week for five weeks. The task of writing was on free text chosen by the students, but if necessary teachers could offer guidance or thematic vocabulary. A text was exchanged every week - the text was written, sent, received feedback for correction and was improved by the tutee and resent to the peer tutor. This process was repeated until each student had sent a total of five texts in L2, responded to feedback and resent an improved version, and had sent five texts in L1.

4.4. Measures

Reading comprehension and writing ability in L1 and L2 were the dependent variables. The following instruments were used:

Reading comprehension in English. Scottish students were administered the test "Performance Indicators in Primary Schools Primary 7" (Curriculum, Evaluation and Management Centre, 2004). For reliability the test has a Cronbach alpha of 0.97 for a sample of 642 students and 0.82 was recorded in the study sample.

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Reading comprehension in Spanish. Catalan Students were administered the test "Evaluation of Reading Comprehension" (Català, Comes, & Renom, 2001), which raises questions of understanding texts of different sources, with a Kuder-Richardson reliability of 0.83. Second language composition. Students had a free writing task consisting of writing a message to fellow tutors and explaining something about themselves. This writing was evaluated using the formulas described by Wolfe-quintero, Inagaki, and Kim (1998) for scores on fluency (number of words per sentence), accuracy (errors per sentence) and complexity (clauses per sentence). The analysis of the correction of the children's pre and post composition was done by one investigator.

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Textual Analysis. We analyzed the texts of a sample of 19 pairs across the spectrum of ability, with a total of 102 English texts (written by Catalan students) and 88 Spanish texts (written by Scottish students). The analysis of all messages in Spanish and English was conducted by two researchers. To ensure inter-rater reliability we analyzed 38 texts (20%) and obtained an inter-rater reliability coefficient of 0.98 (Hernández, Fernández, & Baptista, 2006).

Semi-structured interviews. At the end of the intervention, interviews were conducted with 14 students (7 per country) selected randomly from the experimental sample. Interviews were also conducted with the four teachers involved.

4.5. Analysis

The quantitative results were analyzed using inferential statistical tests (*t*-tests) within and between groups. The qualitative results from the second language compositions, textual analysis and interviews were analyzed by the method of constant comparisons, eliciting themes and then confirming them by repeated analysis. The textual analysis started with the categories that emerged as a result of the last project (morphosyntactic, lexical, etc.) and added new ones developed during the present analysis.

3. Results

1 Reading comprehension tutor L1

The first objective of the research was to determine whether the development of the role of tutor, reading texts critically and offering tutee assistance for their correction, had an impact on the linguistic competence in L1 tutor. Table 1 shows the results obtained by the tutors in reading comprehension. The results of the *t* test for paired samples showed that Catalan tutors significantly improved reading comprehension in L1, but the Scots (although improving) did not achieve statistical significance. It is noteworthy that the number of tutor texts worked at both schools were very similar – there were only 12% of texts not sent successfully by Scottish students and 15% not sent by the Catalans. Four elements may have contributed to the significant improvement of the Catalan tutors: the level of challenge within the text, the selection and correction of basic mistakes, the error type and the type of correction and feedback offered by the tutor.

5.2. Level of challenge of the text for tutors

Spanish texts contained an error rate of 10.23% (901 errors in 88 texts sent). The error rate in English language texts was lower – 5.09% (520 errors in 102 documents sent). The texts in Spanish had a higher error rate and were more complex to correct. Texts containing many errors create a greater challenge for the tutor, who should identify the basic ideas and connect them to attribute meaning to the text. As one Catalan teacher said in the interview: “There were phrases that were not understood, and then pupils asked me for lots of help, and I told them that I didn’t understand either”. This extra effort by the Catalan tutors may have contributed to an improvement in their competence in L1, unlike their fellow Scots, who worked with texts with half this amount of mistakes.

5.3. Tutor’s decision on the selection of error correction

The high rate of error in Spanish texts created a greater challenge for Catalan tutors, who selected and corrected 613 of the 901 possible errors (68.04%). However, despite the fact that English texts contained half as many errors, the Scottish tutors selected and corrected 341 of the 520 possible errors (65.68%). In the interview, a Catalan teacher said: “I think the Scots have done better corrections than we have, because they have selected fewer errors. We told our students not to correct it all, because they wanted to fix everything”. Although the percentage of error correction is similar in both schools, in absolute terms Catalan tutors selected almost twice as many errors to correct.

5.4. Type of error corrected by the tutor

The type of errors students selected and corrected in both countries is summarized in Table 2. Catalan tutors corrected more mor- phosyntactic errors (55.46% of corrections compared to 36.66% of their

Scottish colleagues), particularly articles and conjunctions, and gender and number. While the tutors from both schools seem to have a similar percentage, there were again significant differences in lexical error correction, in which the Scottish tutors provided more than double the feedback than the Catalan students. It seems that the corrections of the Spanish tutors focused primarily on morphosyntactic errors, which relate to aspects of textual coherence and cohesion. This can be linked to deeper linguistic reflection and this type of correction might offer more learning opportunities for tutors in L1.

5.5. Type of feedback offered by the tutor

The type of feedback offered by the tutors is seen as a metalinguistic opportunity for learning in L1. After selecting the error, the tutor provides feedback for tutee correction. Although in the initial training the students were instructed to offer the minimum level of support possible so the tutee corrected the error by themselves, tutors tended to choose the level of support for each error. Table 3 shows the results according to the degree of support. Praising is considered the minimal form of feedback for error correction; while marking the error, explaining how to correct it and providing the correct answer would be the most elaborate feedback possible.

If we compare the performances of tutors from both countries in the degree of feedback offered to tutees, Scots tutors tend to praise, question and correct more than the Catalans. Catalan tutors, however, offered more prompts and clues when correcting. If we organize the

Table 1
Tutor reading comprehension results.

Tutors	N	Pre-test	SD	Post-test	SD	t	Sig. (2-tailed)
Catalan	28	15.29	5.76	19.07	6.24	4.68	*0.00 0.25
Scottish	23	11.43	4.05	12.13	3.87	1.17	

* $p < 0.01$.

Table 2
Type of error corrected by the tutor.

Errors	Catalan frequency	Scottish frequency	Examples
Morphosyntatic Articles & conjunctions	149 (43.82%)	18 (14.40%)	Hay rio
Punctuation	50 (14.71%)	20 (16.00%)	Cómo es tu barrio?
Verbs	26 (7.65%)	37 (29.60%)	Dundee <i>es</i> en el noreste de Escocia
Gender and number	83 (24.41%)	21 (16.80%)	Hay <i>un</i> <i>pequeña</i>
Word order	5 (1.47%)	10 (8.00%)	It's hasn't got <i>center comercial</i>
Prepositions	12 (3.53%)	15 (12.00%)	Build a hut <i>on</i> a tree
Pronouns	15 (4.41%)	4 (3.20%)	<i>My</i> llamo
Phonemes	139 (66.51%)	95 (77.24%)	I've got one <i>dinningroom</i>
Spelling Accents	44 (21.05%)	–	<i>¡Adios</i> Harry !
Capital letters	26 (12.44%)	28 (22.76%)	Vivo en <i>escocia</i>
Lexical Vocabularies	64 (100%)	93 (100%)	It's got five <i>urbs</i>
Total morphosyntatic errors	340 (55.46)	125 (36.66)	
Total spelling errors	209 (34.09)	123 (36.07)	
Total lexical errors	64 (10.44%)	93 (27.27%)	

eight different degrees of feedback into two segments, we note that the Scottish tutors offered their feedback at the lowest level of assistance (33.67% of feedback cf. 18.93% for the Catalan tutors). Catalan tutors, however, tended to offer more scaffolded feedback (81.07% cf. 66.33% of Scots). A Catalan teacher noted: "To correct helped them a lot, especially after seeing how the Scottish children wrote in Spanish. The Catalan tutors have seen the difficulties, have realized that this was not correct Spanish and they have been giving good

or bad prompts, but were able to reflect on this”.

Providing more detailed feedback and more direct support appears to explain the increased Catalan student learning. For the Spanish tutors it was more challenging to review their own knowledge and to find and offer metalinguistic information at the highest level of support for error correction. This risked decreasing the learning opportunities for the tutees, because they did not have any need to search for themselves or work on correcting the error – the task was resolved by the tutor; precisely the task which offered the opportunity for learning.

5.6. Tutees writing in L2

The second research question concerns the effect of the intervention on improving the writing of the tutee. Table 4 shows the results of pre- and post-test in relation to the tutee in writing L2. The results show that the Catalan tutees significantly improved their texts, both in terms of fluency and number of errors on accuracy and complexity of the text. In contrast, the Scottish tutees showed significantly fewer errors made in the text, but no statistically significant differences regarding fluency or the complexity of the text. The qualitative analysis needs to be taken into account to interpret these results. This will take into consideration the percentage of correction they received from their tutors, the types of errors that were corrected, the degree of support offered by their tutors and the tutee response by rewriting the corrected text.

5.7. Corrections received

As noted above, Scottish tutees composed texts with a high error rate (10.23%) and 613 of 901 were selected by Catalan tutors (68.04%). This percentage of correction is very close to that received by Catalan tutees (65.58%), although their texts were of a higher quality (with an error rate of 5.09%). This suggests that the level of feedback for text correction is very similar for both languages.

5.8. Type of errors received

As noted in the results of the tutors (summarized in Table 5), the Scottish tutees received a higher percentage of morphosyntactic error feedback. This involved greater complexity to correct and often requiring restructuring part of the text. Without that restructuring of text it

Table 2

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Type of error corrected by the tutor.

Table 3

Tutor feedback	Catalan tutors	Scottish tutors	Examples
Praise	63 (9.32%)	54 (13.67%)	I enjoyed reading about your dog. Well done!!!!!! :)
Question	3 (0.44%)	30 (7.59%)	Is this right?
Prompt	29 (4.29%)	5 (1.27%)	"What is you name father" (is this the right way about)
Mark	33 (4.88%)	44 (11.14%)	El tutor subraya la palabra/-s; también lo hace escribiendo: fijate, en la primera línea, en la segunda palabra
Lower tutors' feedback	128 (18.93%)	133 (33.67%)	
Mark and prompt	422 (62.43%)	194 (49.11%)	En la quinta línea falta un artículo.
Mark and explanation	56 (8.28%)	27 (6.84%)	At the end of a list don't put a comma.
Mark and correct answer given	68 (10.06%)	39 (9.87%)	En la quinta frase el posesivo y el nombre van en plural
Mark, correct answer and explanation	2 (0.30%)	2 (0.51%)	Delante de "casa" has de poner "una". Los nombre comunes siempre llevan un artículo antes

Feedback offered by the tutor.

explanation

Higher tutors' feedback 548 (81.07%) 262 (66.33%)

Table 4

Composition pre-test and post-test results.

morphosyntactic rewritten sentences or whole passages) were a powerful learning mechanism for the tutors, combined with the development of feedback that enhanced tutee action.

Despite the initial tutor training being identical for Catalan and Scottish students in emphasizing the need to provide the minimum level of support, practical actions were different in each case, showing the importance of the quality of feedback as a key to promoting learning (Cohen et al., 1982; Liang, 2010; Nelson & Schunn, 2009). Scottish tutors responded more exactly to the initial advice and offered more general support. This type of feedback appears to have been the main factor responsible for the writing improvement in the Catalan tutees. Feedback in the form of questions or prompts dominated for Scottish tutors and that seemed to have a positive impact on the tutee, who had to act to correct their own mistakes.

The results obtained corroborate previous studies (Gielen et al., 2010; Topping, 2010) showing that non-directive feedback is more effective for students with higher skill levels (Catalan students had a higher level of English than the Scottish had Spanish). However, it does not confirm that more elaborate feedback is more suitable for students with low ability (Gielen et al., 2010; Topping, 2010), as the Scottish students who received this more elaborate type of help did not improve their overall competence in writing in L2. The feedback offered by Catalan tutors appeared to have helped them to think more about their language, confirming previous studies where the tutor learns by teaching (and the tutee also learns) (Cho & Cho, 2010; Cortese, 2005; Roscoe & Chi, 2007). However, at the same time, such feedback was responsible for the minor degree of improvement in their Scottish tutees. This result agrees with the study of Nelson and Schunn (2009), which also showed a negative effect of more highly scaffolded feedback.

These results lead to a paradox, because the more the tutor learns (by providing feedback with a greater level of support, including resolving the error), the less the tutee learns. The opposite also applies, in that the more the tutee learns (when receiving less structured feedback that requires tutee action), the less the tutor learns. Of course, this paradox only applies in general, and is not necessarily seen in the case of every pair. The asynchronous interaction in this project did not allow for real time interaction, which might be more effective in ensuring accurate and adjusted feedback from tutor to tutee, so it was easy for tutors to provide more feedback than needed. It is well known that it is difficult to provide support within the Zone of Proximal Development, that space between what the student can do by himself and what he can do to with the help of others (Vygotsky, 1995). In synchronous virtual formats or in a face-to-face relationship, the direct contact between the mediator and the learner makes this support easier than in diachronic formats such as this research project.

However, a possible way to resolve the paradox may be to develop exemplar explanations (perhaps in a bank of resources in the classroom), but not provide them unless the tutee made a specific demand. Future studies could also consider the use of software to support instruction, such as Creative Technology's Markin program (2011), in which the tutor could offer feedback from some pre-arranged possibilities.

This could also be a good way to involve the tutee in deciding the extent of help required, perhaps receiving more scaffolded prompts early in the intervention and less scaffolded prompts later.

Incorporating these elements would allow a better alignment of educational support according to the real needs of the tutee. The equilibrium offered by such a system might be the best mechanism to enable students to learn by tutoring (identifying problems and offering help to resolve the error when they know the answers), and the tutees would learn from the carefully adjusted and contingent help to make for themselves a restructuring that makes sense for them.

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