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Contents lists available at ScienceDirect

Computers & Education

journal homepage: www.elsevier.com/locate/compedu

International on-line reciprocal peer tutoring to promote modern language development in primary schools

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ARTICLE INFO

Article history:

Received 25 November 2008

Received in revised form 3 March 2009

Accepted 6 March 2009

Keywords:

Computer-mediated communication

Cooperative/collaborative learning

Elementary education

Improving classroom teaching

Teaching/learning strategies

ABSTRACT

The paper reports data from an on-line peer tutoring project. In the project 78, 9–12-year-old students from Scotland and Catalonia peer tutored each other in English and Spanish via a managed on-line environment. Significant gains in first language (Catalonian pupils) modern language (Scottish pupils) and attitudes towards modern languages (both Catalonian and Scottish pupils) were reported for the experimental group as compared to the control group. Results indicated that pupils tutored each other in using Piagetian techniques of error correction during the project. Error correction provided by tutors to tutees focussed on morph syntaxs, more specifically the correction of verbs. Peer support provided via the on-line environment was predominantly based on the tutor giving the right answer to the tutee. High rates of impact on tutee corrected messages were observed. The implications for peer tutoring initiative taking place via on-line environments are discussed. Implications for policy and practice are explored.

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1. Introduction

The paper reports data from an on-line peer tutoring project. In the project 9–12-year-old students from Scotland and Catalonia peer tutored each other in English and Spanish via a managed on-line environment. The project aimed to:

- Identify suitable schools for study in Catalonia, Spain and Scotland, United Kingdom who are studying English and Spanish as a modern language, respectively.
- Develop activities aligned to the modern language curricula in each school to facilitate the practice of language skills learned by the children in class.
- To establish a managed on-line learning environment to act as a vehicle for peer feedback from a peer tutor to develop modern language capability.
- Explore the processes by which pupils tutored each other in an on-line environment by examining the techniques employed by pupils to provide feedback, advice and support during the process of identifying errors and redrafting texts.

1.1. Peer tutoring

Peer tutoring relies on constructivist approaches to learning and is based on the idea that knowledge acquisition occurs as a social activity (De Lisi & Golbeck, 1999). This is an important area of investigation. Peer tutoring is widely reported to have beneficial effects on learning (e.g. Ginsburgh-Block, Rohrbeck, & Fantuzzo, 2006; Howe, Tolmie, Greer, & Mackenzie, 1995; Rohrbeck, Ginsburgh-Block, Fantuzzo, & Miller, 2003; Topping, Kearney, McGee, & Pugh, 2004). A meta-analytic review of peer learning reported large effect sizes for interventions to promote cognitive growth in mainstream primary schools (Rohrbeck et al., 2003). Peer tutoring is also reported to be widely used in schools (Topping, 2005). Peer tutoring usually takes the form of cognitive co-construction (Vygotsky, 1978) when a more competent peer

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within the class acts to mediate between the new knowledge and the mental activity of the learner. In addition peer tutoring can take place as a result of cognitive conflict when the peer tutor acts to question and attack previously held beliefs and cognitive structures of the tutee (Piaget, 1932).

Peer tutoring is characterized by specific role taking as tutor or tutee, with high focus on curriculum content and clear procedures for interaction, in which participants receive generic and/or specific training. Some peer tutoring methods scaffold the interaction with structured materials, while others prescribe structured interactive behaviours that can be effectively applied to any materials of interest. One of the most recently established forms of peer tutoring is reciprocal role peer tutoring. This form of peer tutoring means that each member of a dyad alternates in a role as peer tutor and tutee and is usually done with same-ability and often same-age tutorial pairs.

Reciprocal peer tutoring was originally designed for pairs of low-achieving, urban, elementary school students (Fantuzzo, King, & Heller, 1992). It employed dyads of comparable ability with the objective of keeping both tutor and tutee actively engaged with the academic process. Students received training before engaging in peer learning. Dyads set joint goals and time-limits for achieving those goals. Monitoring by the teacher ensured that realistic goals are set and that the difficulty of the work is increased as performance was enhanced. Reciprocal role tutoring has the advantage that both/all pupils get to act both as tutors and tutees. It was reported that when pupils act as both recipients and agents of peer tutoring then gains for these pupils were found to be greater than interventions where pupils acted in a fixed tutor/tutee role (Chapman, 1998).

In a small scale study it was reported that low-income underachieving school students in three elementary school settings increased their arithmetic performance due to reciprocal peer tutoring. Students doubled their test scores during the intervention (Fantuzzo, Polite, & Grayson, 1990). Significant gains in spatial ability were reported in a sample of 214, 11–16-year-old pupils in a three month reciprocal role peer learning intervention (Gyanani & Pahuja, 1995). Reciprocal peer tutoring in mathematics was reported to have a positive impact on mathematical ability and student self-reported levels of maths ability when compared to control groups in a randomised trial of 64, 9-year-old pupils (Fantuzzo et al., 1992). Significant gains in mathematics were reported for a sample of 175, 6–10-year-old children for socio-economically disadvantaged children compared to control children in a class wide peer tutoring initiative (Greenwood, Delquadri, & Hall, 1989).

Inherent within classroom organisation peer tutoring there are embedded messages about the status of pupils. Tutors are perceived as higher status than tutees (Sharan, 1980). In a sample of 104, 12-year-old pupils in a reciprocal peer tutoring study enhanced satisfaction with learning and perceived achievement were reported. However, these gains were only evident when pupils were acting in the role of tutor (Rosen, Powell, Schubot, & Rollins, 1978). Methods of selecting roles as either tutor or tutee can influence outcomes as well as behaviour. When tutors and tutees were assigned to each other with no rationale in a sample of 112, 9-year-old pupils in modern languages it was reported that attitudes to the learning process of both tutors and tutees improved. When intellectual characteristics were used as selection criteria enhanced outcomes accrued only for tutors (Bierman & Furman, 1981). However, the problem for reciprocal role tutoring is that if all children in a class are going to take roles as both tutors and tutees then sooner or later children will have to work with a tutor that is of lower perceived status to themselves. Employing reciprocal role peer tutoring in the study reported in this manuscript would not suffer from this issue, as each pupil was a tutor in their own language and a tutee in their modern language. Therefore, a real and obvious attainment gap already existed between the pairs. In addition knowledge of the social status of the peer tutor was not available to pupils and therefore there were not other barriers to tutor acceptance created by these issues.

Perceived social status can influence outcomes. In a study involving 24 children with learning difficulties then tutors of lower social status were found to be less effective as tutors. Social status influenced the nature of interactions and the number of negative responses they received when tutoring (Thomson, 1993). Adopting a tutoring role influenced behaviour in a study of 53 dyads of 9–11-year-old children (Cole, Vandercook, & Rynders, 1988). Disabled children in selective education were paired with children from mainstream classes in either play or academic tutoring contexts. When tutoring children tended to use less appropriate levels of play, less cooperative play and gave less positive reinforcement to their tutee. In a study looking at disabled preschool children in 34 classes it was reported that children who received low sociometric scores from classmates had less positive peer interactions (Odom et al., 2007). Social and cognitive gains are reported to be correlated to each other. In a meta-analysis of 36 peer learning studies in elementary schools Ginsburgh-Block et al. (2006) reported that both social and self-concept outcomes were positively correlated with academic outcomes (Pearson's $r = 0.50$, $n = 20$, $p < 0.01$). Due to the lack of contextual information available to children about their peer tutor when interaction takes place in an on-line mediated learning environment then this medium provides an ideal context for peer interaction, that is not as prone to influence by social status factors.

Training for peer tutors is essential. Experienced tutors were reported to use more appropriate tutoring behaviours that prompted explanations from tutees and asked appropriately challenging questions, rather than just giving explanations (Fuchs, Fuchs, Bentz, Phillips, & Hamlett, 1994). It was concluded that enhanced tutoring was possible because of deeper metacognitive awareness of the problem. Spontaneous (untrained) tutoring behaviours can tend to be primitive (e.g. Person & Graesser, 1999), often characterized by questioning limited both in frequency and level of cognitive demand, coupled with infrequent correction of errors and the giving of positive feedback when not appropriate. Undertaking peer tutoring with strategic metacognition was reported to enhance outcomes in a sample of 158, 9-year-old pupils in science (Meloth & Deering, 1994). Similar findings were reported in a study involving 384, 14-year-old pupils in mathematics (Kramarski & Mevarech, 2003). Significant advantages were reported for pupils who undertook data handling activities with peer learning and an emphasis on strategic metacognition as compared to a control group. Therefore, reciprocal peer tutoring, when combined with strategic metacognitive questioning can provide a strong mechanism for cognitive and affective development.

1.2. Peer tutoring, modern language learning and new technology

Peer assessment is a tool that has reported potential to enhance the learning process for both assessor and assessed. The benefits to the assessor gains benefits in terms of practicing skills already required and being able to generalise these existing skills. This has the benefit of promoting metacognitive self-awareness (O'Donnell & Topping, 1998). In addition correcting the work of other students develops learner autonomy (teachers transfer control to the students and promote self-regulation of learning). This in turn gives opportunities for linguistic reflection and development (Cassany, 2002). In the field of modern language learning then the role of peer assessment can be strongest when the peer acts as an 'interlocutor'. In this sense the peer acts as assessor in their first languages to provide feedback to a peer working in their modern language. This technique has been previously reported for fifth grade language learners in a Spanish immersion class

(Broner & Tarone, 2001). In addition peer assessment of this nature is reported to produce more comprehensible, sociolinguistically more appropriate and correct targeted language (Soler, 2002).

Modern language practice with native speakers is reported to be very expensive and complicated to arrange. Therefore, language teachers are often reported to use interactions among peers of the same class or school as a substitute (Dekhinet, Topping, Duran, & Blanch, 2008). In the traditional modern language classroom, peer support normally takes the form of a peer tutoring approach. More proficient non-native speakers serve as peer tutors to less proficient non-native speakers. During the tutoring, children are often reported to use foreigner talk. The use of foreigner talk assumes sentence and discourse levels that are simplified in structure, that allow for negotiation between interlocutors, and that change in response to the demands of the real situation and the comprehension of the less proficient interlocutor (Flanigan, 1991). Peer learning of this sort has significant potential as a pedagogical approach in modern language education. In the primary school, for example, there is space and time for children in a class of mixed language capabilities to find interlocutors who suit them (Hickey, 2007).

Peer tutoring between native speakers and non-native speakers has been shown to be effective in modern language learning in a study involving 44 graduate and undergraduate students at a university in the USA. However, it has been reported that when peer tutoring is occurring between native and non-native speakers then there can be a tendency for native speakers to take longer turn lengths in conversations, be more directional and less suggestive in their tutoring styles and that an increased power differential between tutor and tutee is reported to develop (Thonus, 2004). These patterns are not reported to exist when peer tutoring in modern language learning sessions run between native speakers. This may indicate that when the power differential is more even, as in reciprocal peer tutoring, then tutoring styles are more effective. Reciprocal on-line peer tutoring was used in an attempt to enhance written language capability in a Canadian university with a group of 94 Japanese students (mean TOEFL score 500). However, English as Second Language students expressed little confidence in peer commenting in general. This left many comments not addressed in redrafted work. In depth analysis of 22 students indicated that only 13 students revised submission on the basis of feedback. Of these 4 made major revisions, 3 made minor revisions and the rest made only self generated revisions. Of 60 negative comments regarding work, 27 were acted upon, but 22 of these were of a minor nature (Guardado & Shi, 2007). In terms of improving own written language by giving peer feedback it was reported that in a sample of 91 students enrolled in writing classes at the English Language Centre at Brigham University then the act of giving peer feedback was more effective than of receiving peer feedback at enhancing written language proficiency (Lundstrom & Baker, 2009). A study involving 66, 11–12-year-old pupils peer tutoring about cultural and ethnic aspects of their community via videoconferencing reported that children's attitudes towards ethnicity in their community changed when pupils engaged in reciprocal peer tutoring with peers in another country. More positive attitudes towards ethnic diversity were reported and pupils reported a wider scope of views about the cultural nature of their local community (Thurston, 2004).

Reciprocal peer tutoring was reported to occur spontaneously during a broadband conferencing project for language learning in French, English and Spanish (Wong & Fauverge, 1999; Zahner, Fauverge, & Wong, 2000). It was reported that such spontaneous reciprocal peer tutoring was effective at promoting collaborative learning, but could require more structure for its effectiveness to be optimised. Similar findings were reported in a two-year long study of post-secondary learners of English and Spanish. In this study it was reported that greater structure in the peer tutoring process enhanced the nature and scope of feedback given during reciprocal peer tutoring in English and Spanish (Ware-Paige & O'Dowd, 2008). In a study involving 26 seventh and eighth grader students with disabilities who used English as a second language reciprocal peer tutoring was demonstrated to be effective at increasing reading comprehension scores with minimal adult input (Klingner & Vaughn, 1996). In a small scale study using a micro-genetic approach to analysis of interactions between two English as second language learners undertaking revision of a text it was concluded that peer revision scaffolding is mutual rather than unidirectional (De Guerrero & Villamil, 2000).

These studies highlight both the potential importance and limitations of reciprocal peer tutoring to promote cognitive and attitudinal changes in modern languages. On the one hand peer tutors might not be of high enough academic or social status for the tutee to act upon their advice. The nature and scope of this advice may also be limited to particular tutoring styles. The result of this may be that tutees do not act upon the advice given to them by tutors. However, it appears that the act of giving feedback may be where most benefit is derived in the reciprocal peer tutoring relationship. Therefore, even if tutees do not act upon advice, the act of giving it may be of benefit to the tutor. Reciprocal peer tutoring seems to occur spontaneously in modern language learning contexts and it would appear that additional work to learn how to optimise these spontaneously occurring interactions may be of benefit.

The project presented here used a variant of the e-mail dialogue journaling described by Shang (2005), but the communication was between students in different countries and of a younger age range. Shang reported that in a sample of 40 non-traditional students enrolled on an English as a Foreign Language (EFL) course in Taiwan that pre-post intervention gains were observed in attitudes and self-concept towards EFL. The technique of asynchronous interaction has been called tandem language learning by Little et al. (1999), who described its use in a college environment. Success in this approach depended on adherence to the principles of reciprocity and learner autonomy. Learner autonomy established a break from traditional teacher-led, one-way instruction and encourages reflective student engagement in the learning process so that students accept responsibility for their learning, take initiative in planning and executing learning activities, and regularly review their learning and evaluate its effectiveness (Holec, 1981; Little, 1991).

The need for clear structures and training for tutors involved in on-line language learning has been previously reported in the field of adult education. These were two of the recommendations made as a result of the establishment of an on-line tutoring programme by the Open University (Stickler & Hampel, 2007). In a study of 549 Spanish language learners studying at an American State University then significant gains were reported for on-line language learners compared to students working from book only environments. However, these reported gains were post interactive and were only evident up to 12 weeks after the on-line learning had taken place (Zapata & Sagarra, 2007). The role of metacognitive knowledge was reported as crucial to successful computer assisted language learning (CALL) in a sample of 146 College students (Yeh & Lo, 2005). In a review of web-based multimedia tools available for Chinese as second language learners then it was concluded that systems of on-line language support that included self-assessment opportunities were most desirable for use in University level settings (Chen & Liu, 2008).

Grammar checkers were used in a study involving 16 modern language writers in a Swedish University. Problems were identified in the use of grammar checkers. It was reported that they did not support both deductive and inductive learning and that participants did not trust the feedback given by grammar checkers (Knutsson, Pargman, Eklundh, & Westlund, 2007). Interaction, whether with peers or teach-

ers, was shown to be essential to promote effective modern language learning in a sample of 24 third year University students in Spain. It was concluded that pragmatic knowledge emerged from assisted performance by both the teacher and peers, but that more effective mediating strategies were actually used by peers, than by the teacher (Soler, 2002).

Modern languages have an increased profile in the curriculum of England, where it is stated policy that by 2010 every child in an English primary school should have the opportunity to study a modern language (Qualifications and Curriculum Authority, 2008), and Scotland, where modern languages have been part of the 5–14 National Curriculum Guidelines since 2000 (Scottish Executive Education Department, 2000). However, despite the increased profile of modern languages in the school curriculum and the growing body of knowledge regarding computer assisted language learning, previous published research on peer tutoring of modern languages between primary school pupils in different countries remains elusive. This study aimed to address this issue and contribute to this important field of knowledge and research.

The research questions for the investigation were:

What are the effects on modern language attainment and ability of on-line reciprocal peer tutoring?

What are the effects on own language attainment of on-line reciprocal peer tutoring in modern languages?

What are the effects on attitudes towards modern languages learning of on-line reciprocal peer tutoring in modern languages?

What are the processes by which pupils tutor each other in an on-line environment and how might these contribute towards changes in cognitive and affective development?

2. Material and methods

2.1. Methods

2.1.1. Methodology

A quasi-experimental approach was used in this research. Quantitative measures were designed to detect changes in cognitive ability in language (both first and modern) and affective disposition towards modern language learning. These measures were administered on a pre and post test basis before and after the intervention. Writing ability in modern languages was also assessed pre and post test with a free writing activity. In addition qualitative data explored the processes of on-line peer tutoring. This analysis focussed on the nature and type of tutoring undertaken by pupils in the mediated learning environment and in addition semi-structured interviews were conducted with class teachers and a randomly selected sub-sample of pupils.

2.1.2. Sample

The project involved 33 (16 female and 17 male) experimental and 52 (32 female and 20 male) control pupils drawn from across five class groups in two different schools based in Catalonia, Spain and Scotland, United Kingdom. All students were aged 9–12-years-old (mean age of the experimental group at mid-test point was 10.44 years (standard deviation 0.73 years); mean age of the control group was 10.25-years-old (standard deviation 2.51 years). The ages at mid-test point of the experimental and control samples were not significantly different as determined by one-way ANOVA ($F(1, 78) = 0.27, p \text{ ns}$). Pre test score in own languages were not found to be significantly different in either the Scottish (ANOVA ($F(1, 40) = 0.313, p \text{ ns}$) nor the Catalan experimental and control samples (ANOVA ($F(1, 38) = 0.023, p \text{ ns}$). Test scores in modern languages were also found not to be significantly different between the Scottish (ANOVA ($F(1, 40) = 1.809, p \text{ ns}$) and Catalan (ANOVA ($F(1, 38) = 0.516, p \text{ ns}$) experimental and control samples. There were significant differences between pre test control and experimental groups (with control groups showing a more positive attitude towards modern languages) in both Scottish (ANOVA ($F(1, 40) = 10.250, p < 0.01$) and Catalan (ANOVA ($F(1, 38) = 7.919, p < 0.01$) pupils. Schools were selected after an invitation within the local education authority with an invitation to participate. The sample schools volunteered their involvement in the project. The schools had students who were studying English or Spanish as a modern language in addition to an information technology infrastructure that could support the intervention. Control groups were formed from another class from the same experimental school. They experienced normal Spanish/English curriculum and tutoring from the same Spanish/English teacher, for the same time period as the experimental group.

2.1.3. Intervention

Students conversed in a managed on-line environment. Students held their own log-in details so that the message site was secure. Students wrote messages in their modern language and corrected messages in their first language. Schools worked on the project for four hours per week over an eight week period. Children sent messages to a peer tutor in their modern language and used the following contexts around which to base their message content: 'Me', 'My Town', 'My Week', 'My Favourite Things' and 'Summer Holidays'. The format of the message exchange was as follows. Children in Catalonia wrote a message in English. This was sent to their Scottish language peer tutor. The peer tutor read the message and corrected it, noting mistakes and giving reasons why the writing was incorrect. This was then sent back to the Catalan tutee. The original message was then corrected and resent. Next the Scottish pupil wrote a message to their Catalan peer tutor in Spanish. The peer tutor read the message and corrected it, noting mistakes and giving reasons why the writing was incorrect. This was then sent back to the Scottish tutee. Again the original message was then corrected and resent. This process of original message, feedback and correction was repeated until each pupil had sent five sets of messages in English/Spanish.

Children in each country were matched on the basis of attainment in Spanish and English. A rank order was produced of the class from best to worst in Spanish (Catalonian students) and English (Scottish students). The best at Spanish was paired with the best at English, second best at Spanish paired with the second best at English and so on until each pupil was matched in a pair.

2.2. Instruments and measures

2.2.1. Reading tests in English

The reading test used was a version of the Performance Indicators in Primary Schools Primary 7 test (Curriculum, Evaluation and Management Centre, 2004). The comprehension sections of the 2004 version of the test were used. This comprised three passages of text fol-

lowed by 10, 10 and 8 multiple choice questions with one correct answer and three distracters. Previously this test has been shown to have reasonable alpha values when used with 642 Primary 7 pupils in Scottish schools (Merrell, 2005) ($\alpha = 0.97$ for reading attainment). Cronbach's alpha values for the reading test in the study sample were 0.82.

2.2.2. Reading tests in Spanish

A standardised reading test in Spanish 'Evaluacion de la comprension lectora' was used to assess the Spanish comprehension of Catalanian pupils (Catala, Comes, & Renom, 2001). The test was a reading comprehension test in Spanish and had 35 items with 5 multiple choice items (four distracters). This test was reported to have alpha values of 0.74 when used in a study to measure language comprehension (Pejenaute-Pejenaute, 1991).

2.2.3. Modern language tests in Spanish

A 15 item test was developed based on the modern languages curriculum in the Scottish schools. Each question was multiple choice with one correct answer and three distracters. Tests had been piloted in a previous project.

2.2.4. Modern language tests in English

A 15 item test was developed based on the modern languages curriculum in the Scottish schools. Each question was multiple choice with one correct answer and three distracters. Tests had been piloted in a previous project.

2.2.5. Attitudes towards English/Spanish measure

A 20 item questionnaire, was used to explore pupils' attitudes towards the school subject of modern languages. The same questionnaire was used in both the Spanish and English classes (but obviously translated into the language of children completing the measure). This was adapted from an instrument designed to measure student attitudes towards science (Pell & Jarvis, 2001). Items were slightly modified from the 'what I think of science' scale. This scale was reported by Pell and Jarvis to have good reliability and validity (Cronbach's alpha 0.74 with a group of 116 11-year-old pupils). Each of 20 items was scored on a five point Likert scale with only the poles marked as agree and disagree. Children were asked to indicate whether they agreed or disagreed with statements. Half of the items on each sub-scale were worded such that the polarity of the response was reversed.

2.2.6. Free writing in English/Spanish

Pupils were asked to undertake a free writing task. They were asked to write a sample message to send to their peer tutor detailing who they were and telling them something about themselves. Free writing was assessed using the formulae described by Wolfe-Quintero, Inagaki, and Kim (1998). They described measures for analysing the fluency, accuracy and complexity of free writing in modern languages. The formulae they described for fluency was number of words per sentence, for accuracy was number of mistakes per sentence and for complexity was number of clauses per sentence (or grammatical complexity). All analysis of free writing was undertaken by the same researcher to ensure internal consistency between analysis of free writing in Spanish and English.

2.2.7. Textual analysis

The process of tutoring was analysed by examining the nature and scope of peer interaction during the exchange of messages between matched pairs. Only sets of texts where each text in the initial text, correction from peer and resent structured text from tutee were present in their entirety were selected for analysis. Text exchanges that had been adversely affected by absenteeism (meaning that different partners were matched for a short time or where feedback or resent corrected texts were not provided) were excluded from this analysis. Analysis identified errors made in the initial message text for each topic and examined which of these errors were identified by the tutor to the tutee. In addition it probed the style of correction and advice offered by the tutor, and finally reanalysed the adapted message sent by the tutee, tracking what had happened to the initial errors. Each text sent over the five consecutive weeks of the project was included in the analysis. There were three aspects to the analysis of the texts, each of them related to one of the following questions:

1. What kind of errors do tutors correct?
2. What level of help do the comments of the tutor offer to the tutee?
3. What is the response of the tutee to the corrections and suggestions of the tutor?

The analysis of the nature and scope of errors corrected by examined error correction within three language categories morph syntax, orthography and lexicon. In terms of morph syntax (the rules concerning the writing of words), the grammar error elements screened were: articles, adjectives, pronouns, verbs, adverbs, prepositions, conjunctions, complements and number morphemes. Orthography errors (misspelling of words, typos and intentional deviations from word conventions) were divided into three types: spelling, capitalization and syllabification (Goméz, 2002). In respect of lexicon errors (words that can be recalled from memory and then sorted into meaningful speech), the main focus was the appropriate use of vocabulary.

The analysis of the level of help offered by tutors to tutees was focused on the nature and quality of scaffolded help using the comments provided by the tutors and dividing them into four levels from Level 4 (minimum level of complexity of help) to Level 1 (maximum order of complexity of help):

Level 4 – The tutor marked the error, but the tutee had to reflect by himself/herself on how to make the correction to the message. This comprised the minimum grade of help given.

Level 3 – The tutor marked the error and offered a prompt or some information to the tutee that guided him/her on how to modify the error by himself/herself.

Level 2 – The tutor marked the error and gave the correct answer.

Level 1 – The tutor marked the error, provided the correct answer and offered an explanation. This comprised the maximum order of complexity of help given.

Finally, in order to investigate the response of the tutee to the corrections and suggestions of the tutor then the last versions of the tutees' messages were considered with the purpose of comparing the modifications made by the tutees and cross referencing these to the help received from their tutors.

2.2.8. Data analysis

T-tests were used to examine within condition pre–post test changes in attainment and attitudes towards modern languages. Two-way ANOVA was used to analyse changes in pre–post test attainment and attitudes towards modern languages using condition (experimental or control) as a predictor of change.

2.2.9. Ethics

Informed consent was obtained from parents and pupils prior to the research project starting. In addition the work was passed through the ethics committees of the local education authorities to obtain consent prior to the commencement of the project.

3. Results

3.1. Use of the managed virtual learning environment

Pupils sent a total of 441 messages during the active period of the project. Messages sent for each section of the project are identified in Table 1. Data indicated that there was a high degree of implementation integrity during each week of the project. Messages sent in English by Catalanian pupils indicated that all pupils sent the required messages, and received a response from their Scottish peer tutor during each week of the project. It should be noted that in the latter half of the project a number of pupils in the Scottish experimental sample were not able to engage fully in the project. In the third message session nine messages, in the fourth session 17 and in the final session 22 messages were lost from the message sequences. A combination of pupil sickness and absence caused by inclement weather (heavy snow-fall during the latter end of the project) were responsible for this. However, different pupils were absent from the project in different weeks so the impact of these absences was spread throughout the sample.

3.2. Pre–post test attainment and attitudes

3.2.1. Attainment scores from Scottish pupils

Data presented in Table 2 indicated that mean first language PIPS reading attainment scores in the Scottish experimental class increased significantly from 8.1 (sd 2.92) to 9.53 (sd 3.43) between pre and post test ($t = -2.377$, $df = 15$, $p < 0.05$). Significant gains were also observed in data from modern language test scores. Data presented in Table 2 also indicated that pre–post test mean attainment in Spanish modern language test scores increased significantly from 7.27 (sd 2.09) to 11.27 (sd 2.28) in Scottish experimental classes ($t = -7.611$, $df = 14$, $p < 0.0001$). However, similar patterns were not observed in the control groups. No significant pre–post test increases were observed in attainment in the first language of Scottish pupils. In the Scottish control group mean scores showed a small, but not significant increase from 8.65 (sd 2.84) to 9.23 (sd 2.83) ($t = -1.154$, $df = 25$, p ns). This pattern was also evident in Spanish modern language mean pre–post test scores in which another modest, but not significant increase was observed from 8.11 (sd 1.97) to 8.63 (sd 1.57) ($t = -1.104$, $df = 26$, p ns). Two way within subjects ANOVAs indicated that the Scottish experimental group gained significantly from pre to post test when compared to the control group in respect of their modern language scores ($F(1,41) = 19.75$, $p < 0.0001$, partial $\eta^2 = 0.34$). However, differences in gains between the experimental and control group did not reach significance in own language tests ($F(1,40) = 0.527$, p ns).

Table 1

Messages sent in each section of the project.

Message sent, plus replies and corrections	Number of messages
First messages sent in English by Catalanian pupils for Scottish pupils to correct	51
First messages sent in Spanish by Scottish pupils for Catalanian pupils to correct	51
Second messages sent in English by Catalanian pupils for Scottish pupils to correct	56
Second messages sent in Spanish by Scottish pupils for Catalanian pupils to correct	35
Third messages sent in English by Catalanian pupils for Scottish pupils to correct	52
Third messages sent in Spanish by Scottish pupils for Catalanian pupils to correct	36
Fourth messages sent in English by Catalanian pupils for Scottish pupils to correct	52
Fourth messages sent in Spanish by Scottish pupils for Catalanian pupils to correct	28
Fifth messages sent in English by Catalanian pupils for Scottish pupils to correct	50
Fifth messages sent in Spanish by Scottish pupils for Catalanian pupils to correct	23
Other general messages	5

Table 2

Mean (standard deviation) scores for pre and post test cognitive scores in experimental and control groups in Scotland, UK.

Experimental or control condition	Number in sample	Mean pre test own language score (maximum score = 15)	Mean post test own language score (maximum score = 15)	Mean pre test modern language score (maximum score = 15)	Mean post test modern language score (maximum score = 15)
Experimental	15	8.1 (2.92)	9.53 (3.43)	7.27 (2.09)	11.27 (2.28)
Control	27	8.65 (2.84)	9.23 (2.83)	8.11 (1.97)	8.63 (1.57)

Table 3
Mean (standard deviation) scores for pre and post test cognitive scores in experimental and control groups in Catalonia, Spain.

Experimental or control condition	Number in sample	Mean pre test own language score (maximum score = 35)	Mean post test own language score (maximum score = 35)	Mean pre test modern language score (maximum score = 15)	Mean post test modern language score (maximum score = 15)
Experimental	17	8.75 (2.18)	19.87 (3.89)	8.12 (1.99)	9.59 (2.45)
Control	23	16.35 (6.83)	7.61 (2.82)	8.74 (3.12)	9.04 (3.12)

partial $\eta^2 = 0.01$). This indicated that although the significant changes in modern language tests could perhaps be attributable to the project, changes in own language scores may not be.

3.2.2. Attainment scores from Catalanian pupils

Data presented in Table 3 indicated that own language Spanish reading scores in the Catalanian experimental sample increased significantly pre to post test from 8.75 (sd 2.18) to 19.87 (sd 3.87) ($t = -12.512$, $df = 15$, $p < 0.0001$). Similar patterns were observed in mean English modern language scores which also increased significantly pre to post test from 8.12 (sd 1.99) to 9.59 (sd 2.45) ($t = -2.230$, $df = 16$, $p < 0.05$). Pupils in the Catalanian control group showed no significant changes in mean own language post test score which scores actually decreased from 16.35 (sd 6.83) to 7.61 (sd 2.82) ($t = -2.016$, $df = 22$, p ns), nor in mean modern languages test score in English within which modest, but not significant increases were observed from 8.74 (sd 3.12) to 9.04 (sd 3.12) ($t = -0.639$, $df = 22$, p ns). Two way within subjects ANOVAs indicated that experimental pupils gained significantly when compared to control pupils in own language pre–post test reading comprehension scores ($F(1,40) = 47.38$, $p < 0.0001$, partial $\eta^2 = 0.56$). However, the experimental group showed no significant advantage in their modern language tests scores as compared to the control group ($F(1,40) = 13.30$, p ns, partial $\eta^2 = 0.05$).

3.2.3. Attitudes towards modern language learning in Scottish pupils

Data presented in Table 4 indicated that mean reported attitudes towards modern languages in experimental Scottish classes increased significantly from 65.87 (sd 15.34) to 76.20 (sd 11.95) ($t = -2.787$, $df = 14$, $p < 0.0001$). Within the control group reported mean attitudes towards modern languages actually significantly decreased significantly from 78.98 (sd 8.38) at pre test to 73.04 (sd 10.19) at post test ($t = 2.808$, $df = 26$, $p < 0.05$). Two way within subjects ANOVAs indicated that the Scottish experimental group gained significantly pre–post test when compared to the control group in respect of their reported attitudes towards modern language learning ($F(1,41) = 15.25$, $p < 0.0001$, partial $\eta^2 = 0.281$).

3.2.4. Attitudes towards modern language learning in Catalanian pupils

Data presented in Table 5 indicated that mean reported attitudes from Catalanian pupils increased significantly from 60.64 (sd 9.09) at pre test to 69.24 (sd 6.34) at post test ($t = -3.875$, $df = 16$, $p < 0.001$). Within the control group reported mean attitudes reported by Catalanian control pupils showed small and insignificant gain in pre to post test measures from 69.55 (sd 9.26) to 69.91 (sd 10.42) ($t = -0.109$, $df = 21$, p ns). Two way within subjects ANOVAs indicated that experimental pupils showed significantly reported higher gains in attitudes towards modern languages ($F(1,39) = 8.25$, $p < 0.01$, partial $\eta^2 = 0.18$). This indicated that the significant changes in modern language attitudinal factors could perhaps be attributable to the project as this pattern was observed in both Scottish and Catalanian pupils.

3.2.5. Assessment of fluency, complexity and errors in Spanish modern language writing by Scottish pupils

Data presented in Table 6 reported mean pre and post test assessment of fluency, errors and complexity in messages sent in Spanish by Scottish pupils. Data indicated that both experimental and control group pupils increased their mean written fluency scores from 3.45 (sd 1.87) to 3.96 (sd 1.70), and from 4.39 (sd 2.64) to 4.66 (3.26), respectively. Complexity scores increased for experimental group pupils from 0.70 (sd 0.44) to 0.81 (sd 0.56), whilst they decreased in control group pupils from 1.35 (sd 1.15) to 1.03 (sd 0.76). Two way ANOVA of experimental and control data from Scottish pupils indicated that neither the observed changes in the fluency ($F(1,41) = 0.056$, p ns, partial $\eta^2 = 0.01$) nor complexity ($F(1,41) = 1.536$, p ns, partial $\eta^2 = 0.04$) of written messages showed any significance difference pre to post test when control and experimental groups were compared. However, the mean number of errors per sentence increased pre to post test in the control group from 1.76 (sd 1.78) to 2.45 (sd 3.06), whilst the mean error number per sentence decreased in the experimental group from 2.00 (sd 1.49) to 0.35 (0.39). When data regarding errors per sentence was analysed using two way ANOVA a significant effect of the inter-

Table 4
Mean (standard deviation) scores for pre and post test attitudinal measures in experimental and control groups in Scotland, UK.

Experimental or control condition	Number in sample	Mean pre test attitudes towards modern languages score (minimum score = 20, maximum score = 100)	Mean post test attitudes towards modern languages score (minimum score = 20, maximum score = 100)
Experimental	15	65.87 (15.34)	76.20 (11.95)
Control	27	78.98 (8.38)	73.04 (10.19)

Table 5
Mean (standard deviation) scores for pre and post test attitudinal measures in experimental and control groups in Catalonia, Spain.

Experimental or control condition	Number in sample	Mean pre test attitudes towards modern languages score (minimum score = 20, maximum score = 100)	Mean post test attitudes towards modern languages score (minimum score = 20, maximum score = 100)
Experimental	17	60.64 (9.09)	69.24 (6.34)
Control	23	69.55 (9.26)	69.91 (10.42)

Table 6

Mean (standard deviation) scores for pre and post test writing fluency, error frequency and complexity measures in experimental and control groups in Scotland, UK.

Experimental or control condition	Number in sample	Mean pre test free writing in modern language fluency score	Mean post test free writing in modern language fluency score	Mean pre test free writing in modern language error score	Mean post test free writing in modern language error score	Mean pre test free writing in modern language complexity score	Mean post test free writing in modern language complexity score
Experimental	15	3.45 (1.87)	3.96 (1.70)	2.00 (1.49)	0.35 (0.39)	0.79 (0.44)	0.81 (0.56)
Control	27	4.39 (2.64)	4.66 (3.26)	1.76 (1.78)	2.45 (3.06)	1.35 (1.15)	1.03 (0.76)

Table 7

Mean (standard deviation) scores for pre and post test writing fluency, error frequency and complexity measures in experimental and control groups in Catalonia, Spain.

Experimental or control condition	Number in sample	Mean pre test free writing in modern language fluency score	Mean post test free writing in modern language fluency score	Mean pre test free writing in modern language error score	Mean post test free writing in modern language error score	Mean pre test free writing in modern language complexity score	Mean post test free writing in modern language complexity score
Experimental	17	5.97 (2.13)	5.64 (1.52)	1.76 (1.11)	0.72 (0.62)	1.49 (0.97)	1.65 (0.97)
Control	23	5.43 (1.91)	5.47 (2.16)	1.21 (0.88)	1.00 (0.71)	0.90 (0.25)	1.06 (0.25)

vention was observed with experimental pupils making fewer mean errors per sentence than control pupils at post test ($F(1,41) = 10.229$, $p < 0.01$, partial $\eta^2 = 0.21$).

3.2.6. Assessment of fluency, complexity and errors in English modern language writing by Catalanian pupils

Data presented in Table 7 reports mean pre and post test assessment of fluency, errors and complexity in messages sent in English by Catalanian pupils. Similar patterns were observed in the assessments of writing from Catalanian pupils as those observed in the modern language writing of Scottish pupils. Fluency scores showed a slight decrease in experimental pupils from 5.97 (sd 2.13) to 5.64 (sd 1.52) whilst control group showed a slight increase in fluency scores from 5.43 (sd 1.91) to 5.47 (sd 2.16). Complexity scores increased in both experimental (from 1.49 (sd 0.97) to 1.65 (sd 0.97)) and control groups (from 0.90 (sd 0.25) to 1.06 (sd 0.25)). Two way ANOVA of the writing in modern language test data indicated that no significant interactions were found in terms of experimental or control group in fluency of writing in modern languages ($F(1,39) = 0.297$, p ns, partial $\eta^2 = 0.008$), nor the complexity of sentence used ($F(1,39) < 0.000$, p ns, partial $\eta^2 < 0.000$). All changes in scores were found to be not significant between experimental and control groups. However, two way ANOVA indicated that there were significant advantages observed for the experimental group in terms of a decrease in the mean number of mistakes made per sentence. Mistakes per sentence decreased significantly more from 1.76 (sd 1.11) to 0.72 (sd 0.62) in the experimental groups as compared to the control group (mean mistakes per sentence in control groups decreased from 1.21 (sd 0.88) to 1.00 (sd 0.71)) ($F(1,39) = 8.006$, $p < 0.01$, partial $\eta^2 = 0.178$).

3.3. Error correction and tutoring

Thirty-two message interactions were selected randomly for further analysis, Messages contained a total of 385 errors; 136 of these were identified and corrected by the tutors. The types of error detected by the tutors were 96 morph syntax errors, 24 orthography errors and 16 lexicon errors.

Morph syntactic errors were those most frequent identified. These tended to be related to the use of verbs (28 corrections); for example: "I born in Morocco" (I was born in Morocco). This subclass was followed by errors surrounding the use of prepositions of place and time (12 errors); for instance, "I get up is eight o'clock (I get up at 8 o'clock), number morpheme errors (12): "There are 14 teacher" (There are 14 teachers) and use of pronouns (10 errors): "I like Antonio Banderas because it has a strong personality" (I like Antonio Banderas because he has a strong personality). 8 errors of articles and conjunctions were identified, the most commonly detected error was incorrect use of the indefinite article "an", when used before a word starting with a vowel, "There is a English class" (There is an English class). The rest of morphosyntactic errors correspond to word order, such as: "I've got brown short hair" (I've got short brown hair), "My number favourite is five" (My favourite number is five).

Regarding orthography errors (24 errors in total), 16 were related spelling, due to phoneme confusion (My favourite foot is canaloni); specific grapheme confusion (There isn't a *Secondari* school) or omission of graphemes (Do you like *swiming* pool?). The rest of the spelling corrections refer to capitalization, while some other errors originated by linguistic differences of both languages.

The 16 lexical errors demonstrated the Spanish language influence when writing, using words with a literal translation, like: "I'm feet 36" wanting to express "My shoe size is...", or the word "eating" instead of "lunch" where the author takes the word literally from Spanish: "Eating is at 2 o'clock" (Lunch is at 2 o'clock). Thus, it is appeared that these errors were due to the Spanish author using a native writing process directly restated without the adopting an appropriate English approach to this issue.

The percentage distribution of scaffolded help was that 17% of correction styles were classified as *mark-give answer-explanation* (22 corrections with level 1 help), 81% classified as *mark-give answer* (112 corrections with level 2 help), 2% classified as *mark-only* (2 corrections with level 4 help). It is relevant to mention that no case of *mark-give a clue* (level 3 help) was recorded.

The most regular scaffolded help was that classified as Level 2-*mark and give answer*, uncovers interesting elements, such as the expression "I think you meant..." showing empathy to the corrected peer; or giving the answer as a suggestion "You normally say: My family and I will go to", or in a tip way "Try to say what you like then what you enjoy". When Level 1 help was given-*mark-give answer-explanation*, the comments were usually related to the correction of another grammar element, "Try to use a capital letter for the name of something and put the name in a parenthesis (those funny marks like apostrophes)". Some explanations were offered using words in Spanish "Use the before nouns. It's a bit like los, or la, le, but not boy or girl". In addition, it is important to highlight that the majority of the comments that utilised Level 1 and Level 2 help strategies appeared during the third set of message exchanges. A notable feature of changes during this

point in the project was that the explanations that tutors gave to guide tutees were structured to give tutees a better comprehension of the rules of the language. There was a shift away from just providing the correct answer (Level 4 help). Data therefore indicated that tutors undertook an adaptation to a more complex tutoring style as they became more skilled at managing interactions as the project developed.

Use of praise from the tutors to the tutees was also observed. Tutors appeared to use praise as a means of supporting and motivating their tutees writing using comments such as “Your message was good today, Well done!”, “Your dialogue was great!”, “Good writing, very few mistakes.”, “Good English, keep it up!”. Of course these comments did not relate directly to specific use of language, but appeared to be used to create positive interactions between the tutors and tutees.

The last element of messages/textual analysis undertaken was the extent to which tutees adapted the texts they sent as a result of the feedback they received from their peer tutor. Analysis was undertaken that compared the adapted text of the tutees with the help offered in respect of the first message by the tutors. Data indicated that in the majority of instances tutees accepted the corrections proposed by the tutee and included them in the redrafted message (93 out of 136 instances). On a smaller number of occasions (21), the tutee decides for an alternative way of writing, generally more complex, to the suggested answer from the tutor, which shows a more active role from the tutee. For example: Tutor: “My dad is called Jordi” – Tutee: “My dads name is Jordi”, Tutor: “My favourite number is six because its a pair” – Tutee: “My favourite number is six because it is an even number”. In a minority of cases (19) the error identified by the tutor remained uncorrected or another error was introduced by the tutee while correcting (4 cases).

4. Discussion

The success of on-line peer tutoring could be explained by existing theoretical models. The managed learning environment provided a context and situation where pupils could practice their language and become fluent whilst engaged in intersubjective cognitive co-construction. The feedback from peers was important in precipitating retuning and restructuring of work. This process of peer feedback is described by [Topping and Ehly \(1998\)](#). However, the real benefit for the pupils of on-line peer tutoring probably lies in the benefits of self-regulation of learning that peer support may facilitate in relation to modern language learning. The importance of self-regulation with peer support was previously reported on a group of 24 first language writers, aged 8.34–8.5-years-old ([Graham, Harris, & Mason, 2005](#)). The important role that the peer can play in developing non-threatening evaluation practices was highlighted in interview responses by children as being an important part of this process. Other research has found that non-threatening evaluation was important to the academic success of 132, 6–9-year-old children in a Canadian elementary school ([Perry & VandeKamp, 2000](#)). The intervention reported in this manuscript had the dual benefit of reducing the power balance between tutor and tutee both because feedback was given by a peer and because feedback was given with a perceived anonymity created by the virtual nature of the tutoring relationship.

Data indicated that motivation was enhanced in modern language learners during the initiative. Motivation can play an important role in predicting self-efficacy and attainment in primary schools ([Nurmi & Aunola, 2005](#)). The motivating influence of peers to promote use of Arabic and Hebrew (mean age 11.7 years $sd = 0.4$) by Jewish and Arab students in Israel was reported by [Tannenbaum and Tahar \(2008\)](#). In this study it was reported that willingness to communicate in the language of the other was significantly increased if the communications was with peers. This finding is consistent with data in our research that indicates that pupils found peer tutoring a motivating real context that gave their communication meaning.

Data on the nature and structure of peer tutoring revealed some interesting patterns and findings. Tutors selected the errors for correction, but fewer were corrected than could have been. The disparity between the number of errors made by tutee, and the number of errors corrected by tutor could be due to one of a number of causes. Time constraints may have presented tutors correcting all errors. With time pressure on the curriculum and information technology equipment and with over 11 errors per message then it may have been simply impossible to identify and correct all errors. Other alternative explanations for this observation may have been that tutors chose to focus on only correcting what they perceived as the most important issues in language development. Alternatively it is also possible that errors were not identified due to the lack of knowledge about language of the tutor. However, given the emergent nature of the modern language development of the tutee, then in the main this explanation seems highly unlikely. It may therefore be incumbent upon teachers to train tutors to ensure that they focus on important sorts of errors when undertaking on-line peer tutoring in modern languages. Tutors will need to detect the main errors and then apply critical criteria to inform their decisions regarding which errors are important. [Cassany \(2002\)](#) proposes the principal factor in error correction is dependent on the communicative purpose of the text. This influences which errors affect the intelligibility of the text, how frequently errors are made, and the role that sociolinguistic values and linguistic interference need to be examined when taking into account which errors to correct, and which to let go. In this study peer tutors tended to correct morphosyntax, and paid particular attention to combinations of verbal correlation. Data indicated that the other training that may be necessary for peer tutors of modern language operating in on-line environments may be what kind of help to give and how. Data indicated that many of the corrections made by the tutors were of the type marking and giving the correct answer to the tutee. This style of peer tutoring limits the help offered and limits the ability of the tutor to give scaffolded support to the tutee.

Data indicated that even with the limited helping strategies employed by tutors then tutees accepted their peer's help and data indicated that in the majority of cases that not only were the modifications suggested by the tutor made, but other enhancements were also undertaken to improve the text. This indicated that the process was driving a move towards learner autonomy in the tutee and may demonstrate an increased self-confidence in the tutees in respect of their knowledge of the modern language. The reported gains in attitudes towards modern languages may support this conclusion to some extent. Thus, it is possible to infer that peer revision provides students with the opportunity to develop critical thinking and metalinguistic skills not only on each other's texts, but on their own also. Another advantage of the peer tutoring process is therefore that the reader is present, not only reading the productions, but communicating his opinion to the author of the text, creating a reciprocal interchange through active writing.

5. Conclusion

Data indicated that in a small scale study that authentic language learning could be important. However, claims cannot be over exaggerated due to the fact that the intervention only used two schools in a quasi-experimental design. Notwithstanding this, qualitative data

did add support to the hypothesis that peer tutoring with authentic contexts for communicating via technology could prove a powerful tool in the teaching and learning strategies to promote modern language learning. Data indicated that the process of error correction seemed to follow a set pattern. Tutors tended to correct similar kinds of errors and tutee appeared to modify their work and writing behaviour in the majority of cases as a result of the feedback that they received. The use of technology had the added advantage that asynchronous communication structures could overcome some of the temporal and spatial barriers that communication between schools in different countries and different time zones could present. Initiative such as the European Commission e-twinning initiative (www.etwinning.net) are already freely available to teachers and this article proposes a structure that could be effectively employed to ensure effective use of such a managed learning environment. Our data would indicate that such initiative may be of use to schools who have the enthusiasm and technological infrastructure to support such a venture.

The results of this research indicated significant gains for experimental pupils of being involved in the initiative. Effect sizes of the intervention as compared to the control classes were good. However, one question that remains unanswered is whether these advantages will be robust enough to survive scale up of the research to a larger sample size and more schools. Future research will answer these questions by expanding the current work into a larger sample. In addition future work will investigate the use of the technique to promote modern language development in other languages apart from Spanish and English. This will involve transfer not only to other language contexts (e.g. French, German), but also to the school contexts operating in schools systems beyond the original sample. Whether the technique proves robust to these transfers remains to be seen.

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