

Collaboration for Learning Language Skills

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Abstract. A Collaborative activity is designed and a software tool is developed to support teaching grammar to primary education students. The activity is intended to create interdependencies among students. The software tool helps to implement the activity. Activity and tool were designed for teaching Spanish grammar, but they can be adapted for teaching other languages.

1 Introduction

Group work has long been used as a pedagogical tool in a variety of learning situations and, indeed, according to Slavin “many studies have shown that two or more individuals can solve problems of different kinds better when they work in groups than when they work independently” [16]. A specific type of group learning is that supported by collaborative techniques: Computer Supported Collaborative Work (CSCL). Collaborative learning technologies must go beyond generic groupware applications, and even the basic technology is not yet well developed [17].

CSCL can of course be applied to teach language skills. Language knowledge is considered one of the most important assets for a person’s life. Thus, language acquisition courses constitute a substantial portion of the primary and secondary curriculum in many countries. Our own University students still have deficiencies in writing abilities; despite the fact the acceptance selection tests include this subject in their evaluation. This situation is further aggravated by recent technology uses - such as textual chat through cellular phones - which do not motivate youngsters to apply good grammar for communication.

Our purpose was to develop a tool to support teaching grammar to primary school students. It is assumed the tool will be used with Collaborative Learning techniques. Specifically, it can be applied to 6th, 7th or 8th grade Spanish grammar students, but it may be adapted to teach other languages grammar as well.

The paper is organized as follows. Section 2 presents related work. The design of the collaborative activity used as a basis for the tool is presented in Section 3. Section 4 includes the main features of the tool. Section 5 presents some practice with the system and finally, section 6 presents the conclusions and future work.

2 Related Work

Sánchez [14] has developed an Internet site for non-specialist students working on Spanish grammar, designed to encourage their autonomy. The site is intended as a complement to regular classes and to the conventional tools. By offering a choice of learning paths, the designers seek to help students to acquire or to reinforce aspects of the declarative knowledge they need to perform language tasks during regular classes.

E-Cid [19] is an online Spanish course replacing traditional lessons. This course is based on contrastive grammar, and has been designed in modular form.

ELMA (Electronic Language Material Archive) [20] is a Web-searchable tool that can be used to customize syllabi according to content-based learning practices. This Web-based content will be accompanied by a battery of activities aimed at activating a student's previous knowledge, facilitating the student's ability to organize information and develop interpretive skills, and at generating class discussion.

Rodríguez et al. have designed collaborative learning games using palmtops for students in the area of Spanish language, obtaining high levels of pupil motivation, attention and concentration [11].

Klein has developed a Spanish class in a collaborative manner without computer support. In his course, Klein improves speaking and writing skills via extensive and intensive practice in both areas [22]. Ying-Hong et al. have developed an English distance learning system (English multimedia corpus). It includes English articles, dialogs and videos [18].

Hardy has developed a Web site to introduce the basic syntactic structure of Modern English and the most common prescriptive rules in formal writing, containing thousands of exercises; students may immediately know the correctness of their answers [21].

The University of Sydney has built web sites, which may be visited to learn English grammar, introducing some basic concepts in English grammar: parts of speech, groups and phrases and subject and predicate [23].

There are many other computer-supported experiences to teach Spanish and English grammar. These cases focus on student group work, not collaborative groups: collaborative activities do not just happen when people are put together and required to do a task in unison [6]. A supportive social milieu and a task infrastructure are required. In this paper, we focus on collaboration as a group phenomenon in which complex tasks are managed through close, step-by-step, apparently casual monitoring by participants of each other's actions, often cued through language.

3 The Collaborative Activity

The decision to use collaborative learning (CL) arose primarily from a desire to innovate and to increase student participation. A cooperative group does not automatically improve the construction of high order cognitive skills and complex knowledge structures. In order to increase the possibilities for mutual understanding and task-related social interaction, interaction tools are needed that are adequately related both to the new concepts to be learned and to the previous experience and knowledge of the students [9]. There should be flexible methods available for the

students, to help them externalize their preliminary ideas and make their thinking process transparent to others. From a constructivist perspective, CL can be viewed as one of the pedagogical methods that can stimulate students to negotiate information and to discuss complex problems from various perspectives. This can support learners to elaborate, explain and evaluate information in order to re- and co-construct (new) knowledge or to solve problems [3, 15]. That is our rationale to design a teaching-learning activity based on collaborative learning techniques.

The designed activity was based on modifying the Language and Communication curricula for 6-8th grades from our Ministry of Education [10]. The Ministry suggests a series of individual activities for grammar contents.

The designed activity includes elements of CL [7]. In particular, the activity was designed to generate interdependencies among group members, such as the need for information interchange during task performing, work splitting into several roles, and the need for explicit knowledge sharing [13]. These interdependencies are the key to collaboration, and it is not easy to achieve them. We based our work on Collazos et al., who have developed a mechanism to structure positive interdependence through software tools intended to make students think in terms of “we” instead of “me” [1]. When positive interdependence is clearly structured and understood, group members perceive that they – and their work- are linked for mutual benefit, that the efforts of each group member will be unique, and that the unique efforts of all members will contribute to success.

The activity has two roles: teacher and student. The teacher prepares the activity and acts as a facilitator. The students work in small groups. They must perform the tasks assigned by the teacher and solve any stated problems. The teacher must select a set of students to do the activity. The number of students should not exceed six, since several studies suggest small groups are best to generate maximum participation and idea interchange [2]. As an example, the activity development will be explained below for a group of four students.

The teacher must choose content for the activity. The content for the example will be a morphological analysis: classify each word from a text to belong to just one category, according to context within its sentence. At the beginning, the teacher must select the work categories (for instance: nouns, adjectives, verbs, adverbs).

The teacher must then find suitable work texts. The number of texts must agree with the number of students who will participate in the activity. The teacher has also to find relevant reference material for the students and make it available to them.

Planning of the activity is done as follows. In our example we have four students numbered S1-S4, and four texts labeled T1-T4. There are four work cycles; each of them has individual work and then group work. Both work types are instances of Problem Based Learning (PBL) [5]. In PBL, the teacher assigns tasks to students, and they must do research and other actions to solve the problems by themselves.

The individual activity consists of studying one morphological element for one of the texts during each cycle. The student must identify which words correspond to this morphological element in the text (Fig. 1). This activity involves a kind of positive interdependence: resource interdependence, allowing students to share materials, information and other resources. This encourages additional conversation and planning and gives elements to the teacher to monitor the activity.

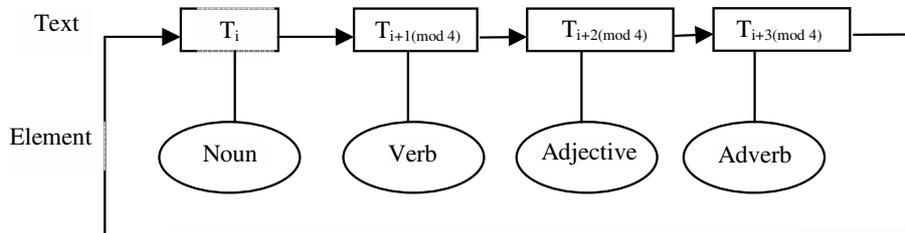


Fig. 1. Assignments for Student S_i

The student must do work in two aspects:

1. Learn about the theory concerning the grammatical element under study. The student may or may not have previous knowledge. S/he may use the reference material, ask his colleagues or consult other information sources.
2. Apply the theory to identify words being the grammatical element in the text, according to their context.

The student tries to find all words belonging to his category in this individual work phase. Three cases may occur: i) s/he rightly chose words belonging to the category; ii) s/he made a wrong choice when selecting words which do not belong to the category; and iii) s/he omitted to choose words belonging to the category. The teacher uses the whole of these cases to determine the student's strengths and weaknesses and to evaluate his/her performance. Note this problem solving involves an understanding of the grammatical elements; it is not an automatic task.

After the individual work, the students must do group work. It consists of co-located correction and discussion of the previous activity. The students must have access to the performance as a group they have obtained thus far. This group activity is very important. When an individual member of the group expresses his/her opinion in relation to the shared public understanding of the group, this will be an attempt to synchronize his/her own understanding with the group-accepted version and make clear the disagreements if there are any. Depending on the outcome of this process there may be further interaction and negotiation until a new meaning or understanding is fully accepted by the group. The key aspects of co-construction of knowledge, meaning and understanding lie on this process interaction among individuals, as well as on their shared and individual cognition.

The group activity ends when the group passes a threshold of performance, e.g., suppose students S_1 and S_2 chose a certain word as noun (correct) and adjective (incorrect) at the same time. If individual performances were to be considered, there will be a right classification (favourable points) and an incorrect one (no points counted). On the other hand, the group numerical performance would be null, because it is incorrect to classify the word both as noun and adjective for that sentence.

The students will have to justify their choices during this group activity, generating discussion. According to Doise and Mugny, the benefits of collaborative learning are explained by the fact that two individuals will disagree at some point, that they will feel a social pressure to solve that conflict, and that the resolution of this conflict may lead one or both of them to change their viewpoint [4]. The social pressure in this case is done by group members wishing to improve the group performance.

The teacher makes the evaluation to determine whether or not the group has passed the performance threshold. In case the group does not approve, the students must continue discussing changes to word classifications. If they pass, each student has probably mastered his grammatical element and learned something on the other ones.

A new cycle is then started with each student in charge of a different element from the one s/he worked in the previous cycle (Fig. 1). This strategy lets each student deal with all concepts of the activity contents. The strategy is consistent with recommendations from standard CL literature: Johnson et al., e.g., recommend rotating roles while the activity be in development [8]. The number of cycles and the number of different texts, then, must agree with the number of students. The teacher can control the difficulty of the text for each cycle; s/he will probably increase it depending on the previous rate of improvement and to keep students' interest. It is also expected the students will increasingly move from consulting reference material to asking colleagues who have already mastered concepts.

4 The Computer Tool

There are three types of tool users: teachers, students and a system administrator. A teacher can create and monitor activities, input texts, input grammatical categories, input reference material and register students. A student can read the activity description and is allowed to do individual and group tasks. The administrator maintains activities and users for the system.

The base work unit is the activity. It has name, description, students assigned to it, a specific grammatical category and a text. Automatic correction of students' classifications is provided if the teacher has done the classification beforehand. Please note this does not mean the activity to be done by the students is going to be mechanical or without reasoning.

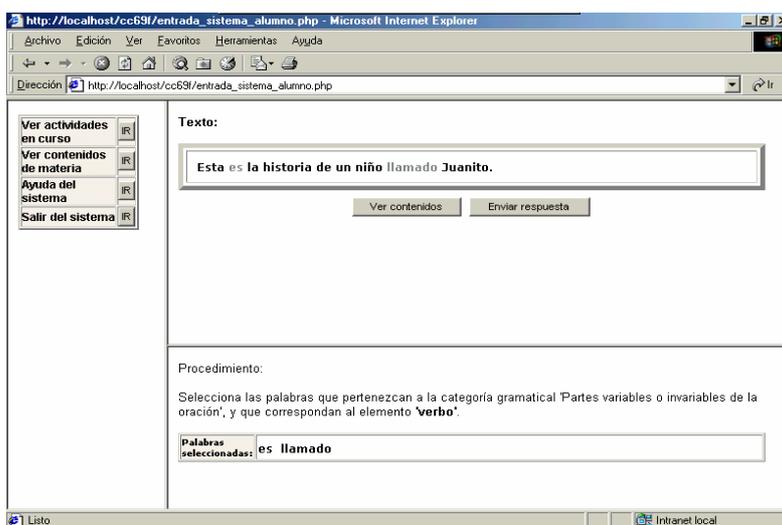


Fig. 2. Individual work UI

Monitoring is provided through statistical reports showing individual and group performance in terms of number of rightly, incorrectly classified and omitted words. The screen also identifies the problematic words. This information, after each cycle, lets the teacher support students by providing hints or suggesting changes.

Each student gets a personalized screen, describing his/her activities. Fig. 2 shows the screen for individual work, which may be asynchronous and distributed. Group work, by contrast, requires face-to-face, synchronous work in just one computer.

Color cues are provided in the screens for easy visualization. Thus, the screen for group work presents all words classified by a specific student with the same color. A distinctive color is used for conflicting words, i.e., those ones chosen by two or more students. The current group performance is also presented in graphic form. Finally, the positive or negative difference with respect to the threshold is also shown.

Both individual and group work user interfaces have a quick access button to the reference material. Therefore, they can easily review relevant theory.

5 Experimenting with the System

A preliminary experimentation was done with 32 seventh grade students (12-13 years old) at a public school in our country, divided in eight groups of four students. We would have liked to assess whether a collaborative activity such as the proposed one actually makes students learn the subject. Furthermore, we should compare this activity to traditional ones to determine the value of the collaborative approach. However, our research is still on-going, and thus, a first pre-experiment was intended just to have a first input about the usability of the tool.

The experiment consisted of two sessions with a questionnaire at the end of each of them. Some improvements to the usability of the software were done between the first and second session, according to the comments of the students. Some of the improvements were: use of standards in colours and icons, a simplified way to enter the application (avoiding the use of login and passwords), use of nicknames, more graphical information (instead text-only interfaces), use of a more simplified language (in the directions and messages), the possibility to change the student data (the nickname, the colours), a simplified way to manage the software security (login and passwords are very complicated concepts).

Table 1. Second questionnaire results

Question	Likert average	Disagree (1 & 2)	Neutral (3)	Agree (4 & 5)
The activity improved my Spanish language knowledge	3.8	13.3%	13.3%	73.3%
The group work improved my personal knowledge	3.6	20.0%	16.7%	63.3%
We finished the activity in a successful way	4.0	6.7%	16.7%	76.6%
I like the group work activity	3.8	6.7%	33.3%	60.0%
Four people were a good group size	3.5	13.3%	33.3%	53.3%
I contribute to my group knowledge	4.3	3.3%	16.7%	80.0%
I liked the activity	3.8	6.7%	30.0%	63.3%
I liked the software tool	4.1	6.7%	23.3%	70.0%

Table 1 presents some of the results of the second anonymous questionnaire. Answers to the questions were in a Likert 5-value scale (5-totally agree; 4-agree; 3-neutral; 2-disagree; 1-totally disagree). Most interesting results were the following ones: over 70% of the students think the activity improved their Spanish language knowledge; 60% of the students also liked group work, and most of the rest were neutral about group work. Only two students (6.6%) did not like the activity.

6 Conclusions and Future Work

Collaboration is not simply a treatment with positive effects on participants. Collaboration is a social structure in which two or more people interact with each other and, in some circumstances, some types of interaction occur having a positive effect [12]. Activities should then be designed accordingly to get a shared understanding of the problematic situation.

Our basic assumption is that CSCL tools must be associated to CL techniques to be truly considered “collaborative”; otherwise it may be just “group” or “collective” learning. The chosen technique in our case was PBL: the activity begins as a task the students must achieve. It is while trying to do the assignment when students need background theory and concepts. Of course, most of the required information is easily available from the reference material, but it is while trying to assimilate it when that information is transformed into useful knowledge. Note that some PBL characteristics such as freedom to decide the methods or plan development, do not apply here.

The developed activity attempts to generate a CL environment, where individual experimentation and group collaboration play a key role in the teaching/learning of grammatical concepts. The software, on the other hand, is intended to simplify the teacher’s task in terms of activity creation and monitoring: the tool automatically corrects students’ assignments and it also provides statistical reports on students’ performance both currently and in its evolution in time. Despite the fact the developed activity was designed to support teaching of Spanish grammar, we think it can be easily adapted to the grammatical elements of other languages.

Finally, it is possible to consider the use of some alternative development and implementation platforms, which could provide additional flexibility to the tool. Specifically, we could include wireless mobile devices as PDAs (Personal Digital Assistants). Naturally, the impact of this technology on the design of the application must be evaluated. The evaluation must include both the technical feasibility and the pedagogical and psychological aspects modelled in the collaborative tool. Our first impression is that both individual and group tasks can be supported with these devices. Individual tasks can be made in an asynchronous distributed way and thus, it should be easy to support them. The synchronous face-to-face group activity could also be supported in its discussion with PDAs.

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