Cooperative Learning as an Engaging Strategy among Compulsory Education Students

M.ª Elena Gómez-Parra[1], Cristina A. Huertas-Abril[2]

Universidad de Córdoba, Spain[1]
Universidad de Córdoba, Spain[2]

Abstract

Research agrees on the need to help students develop relevant skills and abilities, such as intellectual curiosity [1] (Baehr, 2013); openness to the world [2] (Conole, 2013); autonomy and responsibility [3] (Boud, 2005); creativity [4] (Cropley, 1995); critical thinking [5] (Strohm and Baukus, 1995); and teamwork [6] (Kyprianidou, Demetriadis, Tsiatsos, and Pombortsis, 2012). More specifically, cooperative learning (CL) is widely accepted as an effective educational practice [7] (e.g. Peterson and Miller, 2004; [8] Kirschnera, Pass, and Kirschner, 2009, among others). In this context, the educational opportunities of CL are recognised by the scientific community [9] (Gillies, 2014), whose practice is encouraged in the 21st century classroom. This work explores the impact of cooperative learning on a heterogeneous group of 100 Spanish compulsory-education students (aged 8-14) who participated in a project-based implementation of a specific CL technique (Lesson Study) on the frame of DICO+ (2018-1-FR01-KA201-047904). The study research questions focused mainly on students' answers to a questionnaire (pre- and post-) regarding their opinion on their preferred disciplines for CL. By applying quantitative research method students' views were analysed. Findings revealed that students prefer Maths over any other subject (among which first and second languages were included). Overall, data provide evidence that the adoption of CL practices enhances teamwork, leadership skills and critical thinking. Our discussion draws on the idea that teachers should implement CL more frequently in line with the results of this research, as the importance of structuring cooperative work benefits learning [11] (Buchs, 2017).

Keywords: *Cooperative Learning, DICO+, Quantitative Analysis.*

1. Theoretical backdrop

European society is currently going through a major value crisis when it seems crucial to implement educational measures to promote work on "living together" and, even more so, on "building together". International research agrees on the need to help students develop relevant skills, such as intellectual curiosity [1] (Baehr, 2013); openness to the world [2] (Conole, 2013); autonomy and responsibility [3] (Boud, 2005); creativity [4] (Cropley, 1995); critical thinking [5] (Strohm and Baukus, 1995); and teamwork [6] (Kyprianidou, Demetriadis, Tsiatsos, and Pombortsis, 2012). More specifically, cooperative learning (CL) is widely accepted as an effective educational practice [7] (e.g. Peterson and Miller, 2004; [8] Kirschnera, Paas, and Kirscher, 2009, among others). In this context, the educational opportunities of CL are recognised by the scientific community [9] (Gillies, 2014), whose practice is encouraged in the 21st century classroom.

The DICO+ project (2018-1-FR01-KA201-047904) has been purposefully designed to develop cooperative working practices among international European students (Primary and Secondary Education) to enable them to learn together and thus get ready for professional and civic cooperation. This project also aims to increase social inclusion and limit early school leaving. [10] Plante (2012) shows that cooperative learning has a positive impact on student achievement and is inextricably associated to desirable academic attitudes such as effort, motivation and self-esteem. A final category of the beneficial effects of cooperative learning is also included: the development of social and relational skills, which is deeply related to languages and communication.

2. Methodology

The main methodology of this study was designed within the framework of DICO+, by applying it to all focus groups within the project (a minimum of 2 groups per country). The process was placed within a mixed research paradigm, and relied on the data obtained from the participants through the application of the QUAL-QUAL model [12] (Johnson and Christensen, 2008).

The research questions focused mainly on students' answers to a questionnaire (pre- and post-) whose content and reliability had been previously validated according to the Delphi method until it

reached consensus. For this paper, respondents' answers from the Spanish focus group (n= 100) were collected regarding their opinion on preferred disciplines for CL.

2.1 Setting and Participants

The research was conducted in two state schools and one high school located in the province of Córdoba (Southern Spain), which formed the Spanish focus group. The respondents were distributed into 5 Primary and 2 Secondary Education groups for the subjects of English (n= 48 of Year 3 of Primary Education, 7-8-year-old pupils), Mathematics (n= 19 of Year 6 of Primary Education, 10-11-year-old students), and Mathematics (n= 33 of Year 1 of Secondary Education including 5 repeat students, 12-14-year-old students). Out of these, 63 participants were boys (61.2%; mean age 10.32) and 37 were girls (35.9%; mean age 10.56).

2.2 Data Collection

The application of mixed methods research allowed the employment of several types of methods and instruments for the purpose of both qualitative and quantitative data collection and analysis. The research employed a survey as data collection method. This allowed both quantitative and qualitative data to be obtained through the use of Likert-scale and open-ended questions. The questionnaires – originally in French and English – were translated into and distributed in Spanish to assure younger students' understanding of the content of the questions, and to speed up the process of filling it up within the class time.

2.3 Data Analysis

Quantitative data from the Likert-scale items in the questionnaires were processed through IBM SPSS (v. 24 for Mac). As a result, 100 students' pre-test and post-test questionnaires were considered for further analysis. Descriptive statistics were calculated. SPSS was also used to perform Students' t-test, which determined the statistical significance of two key correlations: students' genre and moment of the questionnaire (pre-test vs post-test).

Qualitative data from the open-ended questionnaire items, translated from Spanish into English, underwent a two-step coding process. Firstly, open coding was carried out to identify all the topics responded by the participants answering a given question. Secondly, the frequency of each code was counted and categorized according to their recurrence.

3. Results

In the pre-test, the analysis of participants' responses to the question 'Do you like working in class with other students (i.e. working either in groups or in pairs)?' shows that 59% of all respondents (59 out of 100) 'always' liked collaborative work, while 26% answered "usually', only 15% answered 'seldom', and none responded 'never'. However, there were some minor changes in the post-test, where 51% of all respondents said that they 'always' liked it, 27% answered 'usually,' 21% 'seldom,' and 1% answered 'never.'

After this item, the participants were asked to choose from a list the three subjects where they like to work the most in a group. The results from both the pre-test and the post-test are shown in Table 1.

Table 1. Multiple-choice question: Subjects where students like to work the most in a group (in percentages)

SUBJECT	CHOSEN IN THE PRE-TEST	NOT CHOSEN IN THE PRE-TEST	CHOSEN IN THE POST-TEST	NOT CHOSEN IN THE POST-TEST
Mathematics	59%	41%	67%	33%
Sports	52%	48%	42%	58%
Arts & Crafts	40%	60%	43%	57%
Foreign Language (English)	38%	62%	30%	70%
Mother Tongue (Spanish)	38%	62%	30%	70%
History – Geography	28%	72%	28%	72%
Science	27%	73%	30%	70%
Music	26%	74%	21%	79%
Computer Technology	8%	92%	12%	88%
Religion	8%	92%	11%	89%
Ethics	7%	93%	5%	95%
Civic Education	3%	97%	4%	96%
None	1%	99%	1%	99%

Source: Own elaboration

Although t-test showed no significant differences between pre- and post-tests, they were found ($p<0.05$) in two subjects according to students' genres: English and Civic Education. While the former (English as a Foreign Language) was mainly preferred by boys to work in groups, the former (Civic Education) was preferred by girls.

The following question was a dichotomous question, followed by an open-ended question: asked 'In general, you like working in a group in any particular subject' (Yes / No), and 'If yes, which subject/s?.' Most of the respondents of the Spanish focus group in both the pre-test (78,4%) and the post-test (76%) answered 'yes.' A comparison by t-test showed no significant differences between pre- and post-tests, as well as between students' genres. Table 2 shows the responses to the open-ended question organised per frequency.

Table 2. Free responses to the preferred subjects for CL

SUBJECT	PRE-TEST	POST-TEST
Mathematics	22%	22%
Sports	11%	14%
English as a First Foreign Language	10%	13%
Arts and Crafts	9%	8%
Spanish Language	8%	5%
Social Science	8%	7%
Natural Science	7%	3%
Music	7%	6%
Religion	7%	5%
Ethics	4%	3%
Science (bilingual subject)	2%	1%
French as a Second Foreign Language	1%	1%
Digital Culture	1%	3%
Workshops	1%	3%
Tutorship	-	2%
Curriculum Enhancement	-	1%
Technology	-	1%
Maths Reinforcement	-	1%
All the subjects	3%	3%

Source: Own elaboration

The results from the open-ended question are in accordance with the previous multiple-choice questions, as both Mathematics and Sports are in the two first positions (in percentages). Nevertheless, there is a change in the third and fourth position, as English as a First Foreign Language overtakes Arts and Crafts in the free-response question.

4. Discussion and Conclusions

This research has provided data contributing to the understanding of students' preferences towards CL. As can be seen, in both multiple-choice and open-ended questions, major findings revealed that most students prefer to do Mathematics on CL over any other subject (among which first/main and foreign languages were included). Nevertheless, and despite almost all the respondents (pre-test= 100%; post-test= 99%) liked CL – although frequencies varied –, this does not have a direct correlation when identifying the preferred subject for these strategies, as the highest score found in Mathematics (67%) is still limited. This should also be considered for foreign language teaching, whose outstanding position in the whole pool of subjects is far from positive results regarding CL.

Data provide evidence that the adoption of CL practices enhances teamwork, leadership skills and critical thinking. Moreover, cooperative learners enjoy when working together, develop a sense of responsibility when assuming their different roles, and see differences as a positive element [13] (Smith, 2017). In this light, teachers should implement CL more frequently in line with the results of this research, as the importance of structuring cooperative work benefits learning experiences at all levels.

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