



Effectiveness of cooperative learning: WebQuest as a tool to produce scientific videos

S. Lara^{*,1}, and Ch. Repáraz¹

¹ School of Humanities and Social Sciences. Department of Education University of Navarra 31080 Pamplona SPAIN

This research analyzes the effectiveness of cooperative learning fostered by working with WebQuest. We present the job done with a group of students in fourth of Secondary grade. These students had to produce a scientific video on the geography of Guipúzcoa, for the course of Geography. In order to do so, and following strategies to carry scientific work designed by the instructor in a WebQuest, they carried out research work and then prepared the video. (<http://www.erain.es/vde/produccion3.asp>). Dodge and March argue that through teaching with WebQuest, cooperative strategies can be used with students, and simultaneously, they focus more on the elaboration of information than in unsuccessful search of information on the internet. On the other hand, studies on Cooperative Learning argue that it positively influences both student performance and social interactions. In this paper, we analyze the effectiveness of this methodology to foster cooperative learning strategies. Data collection was carried out through a survey which was specifically designed to collect data about this context of Cooperative Learning.

Keywords WebQuest; Cooperative Learning; Digital Video; Inquiry learning; Secondary level of education.

1. Introduction

At present we are faced with the challenge of fomenting in our students skills and competences related, among other things, with the capacity of information analysis, synthesis and evaluation: the capacity to manage large quantities of information that students easily have at their disposal in this information society; the capacity to use information and communication technologies; a critical capacity; and the capacity to work cooperatively. The use of a WebQuest is seen as an alternative to foment active and cooperative learning, using information from the internet [1,2,3].

This communication presents the results obtained in an investigation carried out with a group of secondary school students who had to produce a digital video on the geography of Guipúzcoa, counting with the help of a WebQuest. We present, in the first place, some of the conclusions obtained in recent investigations on the efficacy of cooperative learning and the WebQuest. Secondly, the methodology and the results of our investigation are described. And lastly, we summarize some of the principal conclusions drawn from our study.

2. Review of literature

2.1 Effectiveness of Cooperative Learning

It is well known that Cooperative Learning (CL) consists of the didactic use of reduced groups, in which students work together to maximize their own learning and that of others. This is a methodology which systematizes, through a series of didactical resorts, the need for members of a group to work together, cooperating with each other in an assignment [4]. A real cooperative situation foment, in the members

* Corresponding author: e-mail: slara@unav.es, Phone: +34 948 425 600 ext. 2769

1 of a group, the certainty that they have to work together to do the task; all the methodologies that exist
2 pursue this objective¹.

3 The studies that have analyzed the effect of CL on students' learning have shown benefits both in vari-
4 ables of a cognitive and an affective type [5,6,7,8,9]. The majority of these studies compare CL efficacy
5 with competitive and individualistic teachings. In summary, the results are as follows: with regard to the
6 variables of a cognitive type, CL foments a greater capacity to resolve problems, facilitates retention, the
7 acquisition of concepts, greater productivity, foments higher quality reasoning, as well as the transfer-
8 ence of what has been learnt. And in relation to the variables of an affective type: CL foments better
9 interpersonal relationships among students, the social support of the group members, an attribution of the
10 success or failure of the task carried out in the group, greater curiosity and continued motivation, greater
11 commitment with learning.

12 2.2 Effectiveness of WebQuest

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15 “A *WebQuest* is an inquiry-oriented activity in which some or all of the information that learners inter-
16 act with comes from resources on the internet” [1]. The WebQuest was created in 1995 by Bernie Dodge
17 and Tom March, two professors of San Diego State University, to help students to make good use of
18 their time, for them to center on using information more than in looking for it, and to develop their think-
19 ing at the levels of analysis, synthesis and evaluation [1,10] (more information in:
20 <http://webquest.sdsu.edu/>).

21 Some quantitative [11,12] and qualitative investigations [13,14,15,16,17], carried out on the work of
22 students in didactic situations with WebQuests, continue to endorse the same results as other studies
23 developed in collaborative work contexts, in relation to: the greater implication of students to work with
24 real topics of their interest; their predisposition to working in a group; the students prefer the help of
25 their equals to that offered by their teacher; the motivation of the students in these contexts; and the effi-
26 cacy of their learning, reaching a high development of cognitive strategies.

27 3. Methodology and Results

28 3.1 Methodology

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31 This investigation is part of a more ample project being carried out by Erain School (San Sebastián)
32 since February-March, 2004. The project is centered on the educational use of digital video. It has been
33 catalogued as Project R+D+i by the *Diputación* (provincial council) of Gipúzcoa and the Basque gov-
34 ernment who collaborated in financing it, together with the European Regional Development Fund. The
35 project consists of the creation of an internet educational digital video portal, using the most advanced
36 internet multimedia technologies in real time video edition and publication [2].

37
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39 This research was specifically developed in a geography class of 24 students (16 years old), in their
40 4th year of ESO (Obligatory Secondary Education) at Erain School. During the month of October, 2004
41 the students had to do an assignment for this subject: a digital video on various aspects of the geography
42 of the province of Guipúzcoa. The students were divided into groups of 3 persons, with a total of 8
43 groups. The assignments they did can be seen at: <http://www.videodigitaeducativo.com/>

44 Each group had a portable Macintosh computer, a digital video camera, the iMovie software for the
45 edition of the video, and limited time for the realization of this work.

46 A WebQuest was created [<http://www.erain.es/vde/produccion3.asp>] to offer the students guidelines on
47 how to make this scientific video. To summarize, students had to carry out a prior investigation, the
48 filming, the edition, and finally the production of the video in their portable computers.

51
52 ¹ Some examples: Jigsaw procedure, Teams-Games-Tournaments, Learning Together and Alone, Constructive Controversy, Group Investigation, Cooperative Learning Structures, Complex Instruction. For more information to see: www.iasce.net

This qualitative research planned to study the efficacy of the WebQuest to foment collaborative learning strategies in the making of a scientific video. To gather data, we devised a questionnaire which was answered by the 24 students at the beginning of November 2004, once they had concluded their video work.

The questionnaire was divided into three great blocks of questions, the first in a scale of six points, the second in a scale of five points, and the third with open questions. In the first block the students were asked if they had worked cooperatively. We were specifically interested in knowing if the same results were obtained as those in the studies on cooperative learning [5,6,7,8,9]. The second block of questions requested the student to make a general evaluation of this way of working. And in the third block, the students were questioned about the format of the work -the digital video-, as opposed to the traditional way of working with pencil and paper. Table 1 shows the eleven questions of the first block, as well as the results. And Table 2 shows the five questions of the second block and the results.

3.2 Results

3.2.1 First block: The features of cooperative work

The results obtained in this first block of questions indicated that the students had worked cooperatively, periodically and frequently. Taking into account that the questionnaire had a scale of six points, 0 meant null frequency and 5, permanent frequency; the average obtained in these first eleven questions was over 3.85 (see Table 1). Therefore, in general it can be said that the students perceived that they had worked in a collaborative manner.

Table 1 Features of the cooperative work. Answers are expressed in %. The scale of six points: 0=never; 1=rarely; 2=occasionally; 3=periodically; 4=frequently; 5=always

Questions/answers	0	1	2	3	4	5	n	Average
1. I listen to, and respect, the ideas of others.	0	4	4	25	42	25	24	3,79
2. I share the load of the work.	0	4	4	20	51	21	24	3,79
3. I value the contributions of the other members of the group.	4	4	13	13	33	33	24	3,67
4. I help in seeking solutions; I am suggestive.	0	0	4	13	50	33	24	4,13
5. I share my information, and take into account the information of others.	0	0	4	29	38	29	24	3,92
6. I have good ideas; I am constructive.	0	4	4	29	38	25	24	3,75
7. I resolve conflicts in a positive manner.	0	0	17	37	25	21	24	3,50
8. I contribute towards making each member of my group do his set piece of work.	0	0	13	29	33	25	24	3,71
9. I help the group find errors and/or mistakes.	0	4	17	25	37	17	24	3,46
10. I have made positive contributions to the group.	0	0	8	8	50	34	24	4,08
11. I am happy about the success of the group.	0	4	0	4	21	71	24	4,54

On analyzing the answers in detail, we observed that the least valued items were 3, 6 and 9 which referred to the resolution of conflicts in a positive manner, offering help to the group to find errors and/or mistakes, and the evaluation that was done of the contributions of the other members of the group. Among the most valued items were 4, 5, 10 and 11 which referred to being happy about the group's success, offering help to seek solutions, making positive contributions to the group, or sharing information and taking into account that of others.

3.2.2 Second block: General evaluation

The results obtained in this second block of questions indicate that the students had positively valued this way of working. Taking into account that the questionnaire had a scale of five points, where 1 means an

1 unsatisfactory evaluation and 5, an excellent one, the average obtained in these five questions was 3.93
 2 (see Table 2). Therefore, in general it can be said that the students evaluated this way of learning as very
 3 good.
 4

5 **Table 2** General evaluation. Answers are expressed in %. The scale of five points: 1=unsatisfactory;
 6 2=poor; 3=good; 4=very good; 5=excellent.

Questions/answers	1	2	3	4	5	n	Average
12. The realization of my role in the group has been	0	4	42	33	21	24	3,71
13. My contribution towards the group's success has been	0	4	37	42	17	24	3,71
14. This way of learning, as opposed to individual work, is	0	4	12	42	42	24	4,21
15. It has helped me to understand the subject better.	4	4	25	42	25	24	3,79
16. I have learnt things of real value.	0	4	21	21	54	24	4,25

17 Among the least valued items were numbers 12 and 13 which referred to the autoperception students
 18 had about their contribution towards the group's success: "The realization of my role in the group" and
 19 "My contribution towards the group's success". On the other hand, the most valued items were numbers
 20 14, 15 and 16 which directly referred to the students' learning. Specifically, the students evaluated work-
 21 ing in a group as very positive, as opposed to other forms of individual work; they stated that this meth-
 22 odology had helped them to understand the subject better, and at the same time, they underlined that they
 23 had learnt things of real value.
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25 3.2.3 Third block: the work with the digital video

26 The questionnaire concluded with a third and last block of open questions, requesting the student to
 27 evaluate the medium used: the digital video. The majority of the students underlined that the elaboration
 28 of the video, compared with a task done with pencil and paper, as an entertaining, attractive and motivat-
 29 ing way that obliged the person to "move" about more, in order to obtain the information necessary for
 30 the video. Although it entailed more work and effort than with a traditional assignment, they preferred
 31 this method because it helped them to understand, and to retain more information. The students also
 32 stated that this method fomented greater involvement in their work. And being able to show their parents
 33 and friends their work, gratified them.
 34

35 On the other hand, a high correlation existed between the marks the students obtained for this work,
 36 and the marks they expected to obtain (Spearman's Rho = 0.82). Although the n (number) was small –
 37 only the correlation of eight groups was calculated- this datum can be evaluated as a consequence of
 38 working with a WebQuest. By this we mean that a work well guided by a WebQuest helps a student to
 39 know what is expected of him, and that he can evaluate his work better.
 40

41 4. Conclusions

42 The results show that the use of a WebQuest helps and guides group members in their investigation work
 43 and in the production of their videos. It motivates group members to learn in a different manner, and in
 44 collaboration with others. It helps them to divide the load of the task among the members of the group. It
 45 helps them to seek solutions, share their information and to take into account the information of others. It
 46 contributes towards each group member working at his task. Everyone learns things of real value. In
 47 short, this way of working is positively valued, as opposed to individual classroom work.
 48

49 A WebQuest definitively secures the development of competences related with scientific investigation
 50 such as: the capacity of information analysis, synthesis and evaluation, of initiative and the taking of
 51 decisions, the capacity of observation and of adjustment to specific facts, evidence, and data, of simplify-
 52 ing what is complex without losing the global vision, of the development of critical thinking, of planifi-

1 cation and organization, of the performance and the evaluation of what has been planned. These are all
2 competences which help students to assimilate knowledge, to integrate them, relate them with others, and
3 thus attain more solid learning [1,3].
4

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