



Skills acquisition: Transference of cooperative learning experiences from the University to Secondary Education

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Resumen

La sociedad necesita ciudadanos capaces de adaptarse y cooperar con otros. Estas habilidades necesitan ser desarrolladas, pero hasta qué punto el uso de ciertas metodologías de aprendizaje, tales como el aprendizaje cooperativo (AC), permiten el desarrollo de dichas habilidades es todavía una incógnita.

En este trabajo realizamos un ejercicio de transferencia de nuestra experiencia en la aplicación del AC en la Universidad de Murcia a centros de enseñanza secundaria de Murcia. Aunque se trata de un proyecto a largo plazo, el primer análisis de esta experiencia a nivel de enseñanza secundaria nos muestra una mejora en los resultados académicos de los alumnos.

A fin de cumplir nuestros objetivos, este estudio se efectúa en dos etapas. En la primera, se aplica el AC a una muestra de 208 estudiantes de tres institutos de Murcia con el objetivo de determinar si se produce una mejora en los resultados académicos en aquellas unidades didácticas impartidas mediante AC frente al uso

del método tradicional. El análisis de los resultados muestra un mayor porcentaje de alumnos aprobados (90,38% vs. 50%), así como una mejora en las notas medias en las actividades trabajadas a través del AC (6,71 frente a 4,7). En una segunda etapa, aún en fase de realización y con una nueva muestra de estudiantes, comprobaremos la mejora en las habilidades sociales de los estudiantes y su impacto en la integración de los estudiantes de diferente etnia o raza.

Palabras Claves: Aprendizaje cooperativo, habilidades sociales, resultados académicos, institutos

Abstract

Society needs citizens able to adapt to and cooperate with others, and these abilities need to be developed. However, how some learning methodologies, such as cooperative learning, help to the development of the abovementioned abilities is still unknown.

In this research we transfer our knowledge and experience in cooperative learning methodology in the University of Murcia to a group of secondary schools in Murcia. Although this is a long-term project, the first analyses of this experience in secondary school education show an improvement in students' academic performance after the implementation of cooperative learning in class.

To reach our objectives the paper has been divided into two stages. First, we implemented cooperative learning in a sample of 208 students from three different secondary schools, in order to test if the students get better academic results in those didactic units where the teacher used cooperative learning. Quantitative analysis of the data confirm that students not only got a higher pass rate (90.38% vs. 50%) but also a higher average mark (6.71 vs 4.7). In the second stage, still on process, and with a new sample of students, we will check the students' social skills improvement and the impact of this methodology on class integration of students from different ethnic and race groups.

Keywords: Cooperative learning, social skills, academic results, secondary schools

1. Theoretical framework.

Educational objectives in current democratic societies, identify education as the cornerstone of modern societies that base development not on country natural resources but on human capital (Alfageme, 2007).

As indicated by Martinez (1995, cited in Traver and Garcia, 2006), it is not enough to be a good student and repeat by heart the contents transmitted by teachers to become a good professional. Instead, society needs open-minded people, ready to be self-learners, that must be concerned with research and professional updating; at the same time as they are engaged in the socio-cultural transformation of environment in order to achieve progressive degrees of justice and solidarity.

Therefore, education policies must seek appropriate educational strategies and



techniques to achieve a high quality education system ready for the challenges of 21st century societies that include societies involved in multicultural, inclusive and cooperative contexts as well as immersed in information societies. In order to be able to improve our education policies it is important to understand which methodologies are more suitable to reach our best interests, such as the creation of not only self-learners and open-minded people, but also citizens that enjoy living in a multicultural context.

The teaching-learning process throughout the 19th and 20th centuries has accurately defined the roles of teachers and students. During these centuries, teachers were the transmitters of knowledge often based on the explanation of contents, almost always theoretical. Under this view, the role of students has become purely passive and they are just simple recipients of the contents indicated by the teacher. However, in the last quarter of the twentieth century the concept of cooperative learning appeared in the scientific literature and prompted the use of these educational strategies in the classroom (Rue, 1998).

In the Spanish context, the Organic Law on the Education System (LOGSE) already introduced in 1990 the active learning and the promotion of active methodologies in the classroom, so teachers and students could be participants in the teaching and learning process, while both the personal and individual effort and teamwork could be promoted as necessary elements for a successful integration into society. As stated in the UNESCO report of the Commission on Education for the XXI Century, a complex and global information society, requires a teamwork ability of the citizen to process and assimilate the massive information and the rapid changes that this information promotes (Delors, 1996).

Modern societies need citizens able to adapt and cooperate, and learning these principles is basic for the development of these modern societies. Therefore, the LOGSE introduced teamwork as a goal in itself as well as a tool for learning subject-matter knowledge. Moreover, these principles of cooperative work have been reinforced in the current educational panorama with the emergence of the concept of competence.

From the educational point of view, and on the basis of the project Definition and Selection of Key Competencies (DeSeCo) promoted by the Organization for Economic Cooperation and Development (OECD) in 2003, basic and key skills are understood as "those that contribute the development of a successful personal life and proper functioning of society, because they are important for the different areas of life and important to all individuals".

From this report, most OECD countries, including the European Union, have begun to reshape the school curriculum around the controversial, complex and powerful concept of competence in which the active role of students in the process of Learning is crucial. This new educational approach requires a teaching practice affecting both the body of knowledge and the skills and attitudes necessary for goal achievement and personal development. This is to provide knowledge in action, for action and above action (Zabala and Arnau, 2007, Escamilla, 2009; Sanmartí, 2010).



In this global context, the concept of cooperative work appears not only as an academic resource but also as a way to improve social relations (Rue, 1998; Huertas and Montoro, 2001). According to Alfageme (2003), from the psychological point of view, working groups are part of the core of the teaching and learning process since personal growth is inseparable from progress and relationship. According to Lobato (1998, cited in Alfageme, 2003), cooperative learning in small groups also enables a number of achievements, including:

- The promotion of effective schools that contribute to personal and social development of students.
- The use of diversity in classroom and promotion of positive multicultural relations.
- Maximizing equal opportunities in education.

Therefore, if the latter means the achievement of a real citizenship education that implies the training of workers as well as active citizens for a modern democratic society, it is necessary to work explicitly such content, which forces us to consider different educational strategies and tools to those used in previous periods.

Previous researchers have defended the goodness of the cooperative learning methodology. However, there is a lack of empirical research that proves the positive effects that cooperative learning has not only on the academic results but also on the development of good citizens. That is, the objective of this research is to measure the impact that this methodology has on the academic results (first study) and on the social abilities of the students (second study).

Among the different cooperative work techniques, the puzzle conceived by Aronson (Aronson et al, 1978) has proven its effectiveness in educating in attitudes and promoting positive attitudes toward school and peers. But foremost, the Aronson's Puzzle helps to teach and learn attitudes of solidarity among students (Traver and Garcia, 2006). The reason is that the teacher is no longer the center of the teaching-learning process and the students are compelled to treat each other as essential elements for progressing in learning. This includes:

- The learning process is structured so that individual competitiveness is incompatible with success.
- Success can only be achieved if there is cooperation among students within the group.
- All students, regardless of status within the class, have the chance to provide insights by their own.

As a strategy of cooperative learning, the puzzle technique is based on a constructivist conception of shared knowledge, which is crucial for the benefits of social interaction (Traver, 2000). This technique requires an active involvement since it is not only necessary to understand and, assimilate the object of the study but also to interact with other peers. Likewise, the practice of the puzzle involves subject-matter knowledge, procedures and attitudes (Traver and Garcia, 2006), that is, the

basic elements in the current teaching-learning process. Such stratification of specific objectives is as follows:

- As content, it allows both the subject-matter content and the concept of solidarity and cooperation.
- As a procedure, it is a specific technique of solidarity and cooperation that helps to generate synergies by allowing dialogue and real engagement of all individuals in the group, obtaining a better result than that achieved as an individual.
- As an attitude, the puzzle helps to develop the principle of solidarity and to create a positive predisposition toward this type of behavior in students.

As Traver and Garcia (2006) stated, this is enough to recommend its use for training and for improving solidarity in the classroom.

2. Methodology

According to Gil (2010), cooperative learning is defined as a learning process based on group work, collective construction of knowledge and the development of mixed abilities (learning and personal and social development) where students take responsibility for their own learning and that of their peers.

Previous empirical research shows that university students improve their learning outcomes after the use of this learning strategy (Alarcón et al., 2011).

The research that we present in this paper is the result of transferring our knowledge and experience of the implementation of the cooperative learning methodology at the university to secondary education, as a tool for theoretical and practical learning..

We develop this experience in two stages. In the first one, the experience of using cooperative learning in secondary education took place in the High School Cañada de las Eras, located in Molina de Segura (Murcia). A sample of high school students from two different courses was used, that is, 50 students from the Economics course, and 54 students from the Philosophy and citizenship course.

For the Economics course, two groups of first year of secondary education in the modality of Social Science (1^ºA and 1^ºB) took part in the experience. In both groups all the students followed the course Economics, a course included in the abovementioned modality of Social Science. A practice was carried out in the first term of the year 2011-2012. The second didactic unit of the course program, named "The economic systems", was chosen for this practice. This unit was split into three parts in order to use the "puzzle technique": the market system, the central planning, and the mixed economy.

As for the Philosophy and citizenship course, another practice based on the cooperative learning was carried out with the same groups of secondary school (1^ºA and 1^ºB) during the first term of the year 2011-2012. In this case, we chose the third unit of the course program, named "The spaces of the human being: nature, culture



and society”. The central topic of this unit is the human being as a cultural being. The practice based on the cooperative learning has the aim to make students reflect on the distinction between nature and culture, the culture as something characteristic of the human being and the different attitudes toward the cultural diversity. Therefore, we chose three basic readings in which the abovementioned topics are analyzed: Mosterín (2006), Harris (2007) and Levi Strauss (1999).

During the whole process, the secondary school teachers participating in the experience had the assistance of the teaching innovation group of the University of Murcia IDEÉ.

During the second stage some of the previous secondary schools teachers participating in the experience left the project and new secondary schools teachers joined the team. For this stage, we now count on 7 schools teachers from the following high schools: “Cañada de las Eras” (Molina de Segura), “José Ibañez Martín” (Lorca), “La Flota” (Murcia), “Infante” (Murcia) and “Cooperativa de Enseñanza Luis Vives” (Murcia).

Again, during the whole process, the secondary school teachers participating in the experience have the assistance of the teaching innovation group of the University of Murcia IDEÉ. A questionnaire has been developed to collect information about the students’ experience and perceptions in relation to cooperative learning, including social skills and relations with others, among others. Additional information such as personality traits, attitude towards the studies and extra-curricular activities are also included.

The analysis of this information will allow us to link students’ performance and social skills with the use of cooperative learning.

3. First stage results

Once the cooperative learning experiences finished, first term evaluation tests were set, including both the unit worked with the cooperative learning and those units worked with traditional teaching methods. Using the results of both systems, the average marks obtained through cooperative learning and through the traditional teaching method were calculated. Table 1 shows the average marks of both systems, by sex and by course, that are evaluated in the traditional scale from 0 to 10 points. Students pass with a 5.

To test if the cooperative learning method has a more positive impact on students results than the traditional method, we performed a t-test, in which the means are compared. Results show a higher percentage of passed students in the evaluation of those units that have been explained in class through the cooperative learning, 90.38% against 50%. Moreover, the average mark is also higher, 6.71 over 10 compared to 4.7 over 10 ($t=7.38$, $p<0.001$). These results are similar to those obtained by splitting the sample on the basis of students gender and course (see Table 1).

TABLE 1. Students average marks through cooperative learning and through the traditional method

<i>Panel A: Results for all the courses</i>						
	Obs.	Marks Mean with Cooperative learning	Marks Mean with traditional learning	Mean difference	Statistic t ¹	(p-value)
Total	104	6.71	4.70	2.01	7.384 ^{***}	(0.000)
Men	56	6.79	4.66	2.13	5.941 ^{***}	(0.000)
Women	48	6.62	4.74	1.88	4.462 ^{***}	(0.000)
<i>Panel B: Results for the Economics course</i>						
	Obs.	Marks Mean with Cooperative learning	Marks Mean with traditional learning	Mean difference	Statistic t1	(p-value)
Total	50	6.74	4.62	2.12	4.772 ^{***}	(0.000)
Men	27	6.69	4.54	2.15	3.492 ^{***}	(0.001)
Women	23	6.80	4.71	2.09	3.183 ^{***}	(0.001)
<i>Panel B: Results for the Philosophy and citizenships course</i>						
	Obs.	Marks Mean with Cooperative learning	Marks Mean with traditional learning	Mean difference	Statistic t1	(p-value)
Total	54	6.68	4.77	1.91	5.805 ^{***}	(0.000)
Men	29	6.88	4.77	2.11	5.307 ^{***}	(0.000)
Women	25	6.46	4.78	1.68	3.073 ^{**}	(0.003)
Significance levels: *** 1%; * 5%; * 10%.						
(1) t-test was performed assuming equality of variance since the Levene test showed equal variances.						

These results show an improvement in secondary school students' marks when cooperative learning method is used. At this point, it is of great interest to prove if this effect is the same for all the students or if there are differences between those who pass and those who failed through the traditional method. As a consequence, we calculated the average mark by splitting the sample into two groups: the first made up of those students who passed with the traditional method, and the second made up of those who failed with the traditional method. In Panel A of Table 2, we observe a small improvement in the mark of the first group of students. They move from a mean mark of 6.55 to a mean of 7.12 ($t = 2.08$, $p < 0.05$). For the second group, the use of the cooperative learning involves a substantial improvement in the results since the number of passed students increases, and the mark mean goes from 2.85 (failed) to 6.30 (passed).

TABLE 2: Differences in cooperative learning results comparing students that passed with those who failed with the traditional method

<i>Panel A: Results for all the courses</i>							
	Obs.	Marks with Cooperative learning	Mean	Marks with traditional learning	Mean	Mean difference	Statistic t1 (p-value)
Passed	52	7.12		6.55		1.33	2.081** (0.04)
Failed	52	6.30		2.85		3.45	12.023*** (0.000)
<i>Panel B: Results for the Economics course</i>							
	Obs.	Marks with Cooperative learning	Mean	Marks with traditional learning	Mean	Mean difference	Statistic t1 (p-value)
Passed	29	7.40		6.38		1.02	2.471** (0.017)
Failed	21	5.83		2.2		3.64	7.385*** (0.000)
<i>Panel C: Results for the Philosophy and citizenship course</i>							
	Obs.	Marks with Cooperative learning	Mean	Marks with traditional learning	Mean	Mean difference	Statistic t1 (p-value)
Passed	23	6.78		6.77		0.01	0.039(0.969)
Failed	31	6.61		3.3		3.31	10.491*** (0.000)

Significance levels: *** 1%; * 5%; * 10%.
 (1) t-test was performed assuming equality of variance since the Levene test showed equal variances.

We analyzed these differences by course (see Panel B and C in Table 2), and we obtained almost the same results by course. In the Philosophy and citizenship course the first group of students did not show an improvement in their qualifications while this improvement took place in the second group ($t=10.49$, $p<0.01$).

4. Conclusions

Summing up, the results from the application of the cooperative learning method in secondary education show an improvement in the process of competence acquisition by the student. Specifically, results show a higher percentage of passed students in the evaluation of those units that have been explained in class through the cooperative learning (90.38% vs. 50%) and the average mark is also higher, 6.71 compared to 4.7 over 10 ($p<0.001$). No significant differences have been found by gender or by course.

Moreover, when splitting the sample into two groups (the first made up of those students who passed with the traditional method, and the second made up of those who failed with the traditional method), we obtained another interesting result. The use of the cooperative learning involves a substantial improvement in the results since the number of passed students increases, and the mark mean goes from 2.85 (failed) to 6.30 (passed).

These conclusions are especially interesting for the Spanish context since cooperative learning can help to reduce scholar failure in secondary education by improving the average mark of students, and more specifically of those students who previously obtained bad results.

Our results support this methodology and aim us to make our second question related to the development of social skills. Therefore, the second stage of our research will allow us to relate cooperative learning to the development of social skills and to study its effect on the integration of students from different backgrounds, ethnicities or races.

The latter means the achievement of a real citizenship education that implies the training of workers as well as active citizens for a modern democratic society. It is necessary to work explicitly such content, which forces us to consider different educational strategies and tools to those used in previous periods. If results are positive, cooperative learning will prove to be a necessary and useful learning strategy.

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