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Transversal skills development through cooperative learning. Training teachers for the future

Natalia Larraz, Sandra Vázquez and Marta Liesa

Abstract

Purpose – *The purpose of this study is to analyze and assess the impact of cooperative learning in the acquisition of generic skills in teaching students.*

Design/methodology/approach – *The methodology underlying this research has a qualitative orientation. An ad hoc questionnaire has been used as an instrument, in addition to a team notebook, and the observation as procedure to analyze the perceptions of the students in the process.*

Findings – *The main results indicate that thanks to the active methodologies, more specifically, the cooperative learning, students develop and improve transferable skills, such as negotiation, leadership, teamwork, reflection, etc. Similarly, the authors have observed improvements in the classroom environment and their social interactions.*

Research limitations/implications – *The limitations and possible implications of this study are in the direction of analyzing the implemented cooperative learning methodology techniques to observe the existence of differences in learning. Moreover, they are also related to the analyzing of individual implications for teamwork to assess group learning and its influence on motivation and teamwork. Finally, they are related to the analysis of the involvement of observation and self-regulatory mechanisms in the teamwork learning.*

Practical implications – *With this research, the authors incise in the necessary methodological change in universities, responding to the demands of the European Higher Education Area (EHEA) and highlight the importance of using active methodologies.*

Social implications – *Cooperative learning is an effective teacher training tool for future teachers who will have to develop in an interpersonal context and, in turn, will teach students who need to acquire a personal and social skills.*

Originality/value – *This paper evaluates the impact of using active methodologies and how they contribute to the development of transversal or generic competencies in a real context of university learning.*

Keywords *Higher education, Cooperative learning, Innovation, Teacher training, Transversal skills*

Paper type *Case study*

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1. Introduction

Social changes require new skills and demand graduates with higher professional qualifications. From the European Higher Education Area (EHEA), it is being demanded an educational response to these requirements. This response must be carried out through a methodological change, where the student becomes the centre of the learning process in which the focus must be put on active methodologies. Thus, an experience of cooperative learning in the classroom starts in the University Degree of Teaching at the University of Zaragoza, specifically in the first year.

We chose to work with this methodology because it is based on assumptions that lead to this change: the sociocultural theory of Vigotsky (1978), the genetic theory of Piaget (Piaget

and Inhelder, 1981), the theory of positive interdependence of Johnson and Johnson (1989), the humanistic Psychology of Rogers brothers (Rogers and Freiberg, 1996) and the theory of multiple intelligences of Gardner (1998).

In addition, we agree with Pujolàs (2012) that some social skills are enhanced from cooperation, skills such as dialoguing, negotiating, conflict resolution and problem solving. Moreover, there is an improvement in communication skills, such as expressing, arguing and interpreting thoughts, feelings and facts, listening to the ideas of others, accepting and making constructive critiques, being empathetic, respecting different opinions to your own ones in a sensitive manner, etc. All of them are transversal skills needed for the performance of the teaching profession in the current context, which can hardly be acquired by using a traditional methodology in which students have a passive role.

According to this question, cooperative learning is able to stimulate a deeper approach in learning in higher education students and therefore, in recent years, cooperative learning has become a teaching tool, increasingly popular at the university level (Cavanagh, 2011; Millis and Cottell, 1998; Benito and Cruz, 2005).

To deepen the impact that this methodology has had on the development of transferable skills in future teachers, we proposed a descriptive study design with a mixed methodology whose results we present in this article.

1.1 Cooperative learning in the university classroom

The EHEA has involved a change in teaching methods and in the role of students and teachers. Cooperative learning (CL) is an active methodology that fits the pedagogical foundations demanded in this context (Benito and Cruz, 2005).

Cooperative work is one of the most valid ways to respect individual differences present in the classroom, and to make all students achieve the learning goals considering the individual work as part of a whole, in which everyone is essential, where all of them progress according to their needs and where they all receive the support needed to successfully complete the requested tasks (Essomba and Laborda, 1995). Therefore, CL promotes a type of learning in which all students are part of the school, encouraging a kind of methodology peculiar from inclusive education (Pujolàs, 2008).

In addition, Millis and Cottell (1998) provided empirical evidence in support of CL improvements in the students' performance of higher education, as a higher level of motivation and cognitive effort in learning, provided by an increased sense of responsibility and willingness to invest effort, and a setting in which students engender critical thinking, as well as CL, offers students and faculty a structured, on-task means to foster learner activity and learner interaction.

At this time, the process of adaptation to the EHEA has been completed in all Spanish universities. This process is interested in students work and classroom teaching and learning processes by which students achieve the learning objectives (Palacios, 2004).

The results of different studies carried out at the higher education level, including students from early childhood to the university level, have shown a favourable perception of the students towards this type of methodology and towards its impact on their learning process (Pegalajar and Colmenero, 2013).

On the other hand, it is essential that future teachers would be able to participate in training programs which will allow them to implement such CL process within their classrooms (Giménez, 2014). To implement CL effectively in the classroom, Pujolàs and Lago (2011a, 2011b, 2011c) and Pujolàs (2012) suggest that it is a must to have followed three fundamental steps, and these steps are based on the cooperate to learn/learning to cooperate (CL/LC) programme; first, to achieve group cohesion and foster a climate of classroom teamwork; second, to have carried out teamwork experiences in two or three

teaching units using simple cooperative structures; and finally, to teach how to teamwork in a stable and durable way, being able to form foundational teams. They stated:

Teaching our students how to teamwork, consists, basically, in helping them to specify clearly the purposed targets (targets to be achieved) and teaching them how to organize as a team, to achieve these goals. This involves the distribution of different roles and responsibilities within the team, as well as the distribution of the different tasks, if the goal is doing something together. Finally, it also consists in teaching the essential social skills to teamwork in small groups by practicing them (Pujolàs and Lago, 2011c, p. 3).

In this line, Kaufman *et al.* (1997) showed several questions to take into account to implement CL in higher education effectively, such as follows:

- There has to be six basic elements: positive interdependence, high degree of verbal, face-to-face interaction, individual accountability social skills, group processing and appropriate grouping. A clear structure should be imposed. A structure provides a set of guidelines for students (and faculty) in the course organization, small group process and assessment methods.
- Students respond very positively to CL.
- Preparation of faculty is essential and preparation of students is critical. Implementing CL with students increases cooperation among faculty.

1.2 Transversal skills

The transversal or generic skills are an essential part of the professional and training profile of most degrees, and they have been defined as generic aspects related to knowledge, skills, dexterities and capabilities that any graduate must have achieved before entering the labour market. They include a set of cognitive and metacognitive skills, instrumental knowledge and attitudes with a great value for society of knowledge and lifelong learning (Sánchez-Elvira, 2008).

Transversal skills were defined by the National Agency for Quality Assessment (ANECA) from the Tuning Project (González and Wagenaar, 2003) and were normalized into the following transversal skills (Table I):

- *Instrumental skills*: cognitive skills, methodological skills, technological skills and linguistic skills.
- *Personal skills*: individual abilities and social skills.
- *Systemic skills*: skills regarding the understanding of complex systems.

Besides the above skills, there are others which are formed by two subgroups. The first group is related to the knowledge to be acquired by the graduate out of college, wherein the use of the Internet as a mean of communication and source of information, and the previous experience and the knowledge of a second foreign language are included. The second group is related to those skills of the graduate that can be positively valued by

Table I Tuning Project transversal skills (2000)

<i>Instrumental skills</i>	<i>Personal skills</i>	<i>Systemic skills</i>
Capacity for analysis and synthesis	Teamwork	Autonomous learning
Ability to organize and planning	Work in an interdisciplinary team	Adapting to new situations
Oral and written communication	Working in an international context	Creativity
Knowledge of a foreign language	Skills in interpersonal relationships	Leadership
Computer skills related to study field	Recognition of diversity and multiculturalism	Knowledge of other cultures and habits
Ability to manage information	Critical thinking	Initiative and entrepreneurial spirit
Troubleshooting	Ethical commitment	Motivation for quality
Decision-making		Sensitivity to environmental issues

employers: the ability to apply theoretical knowledge into practice, the ability to communicate with non-experts in the field, the ability to understand the language and proposals from other specialists, professional ambition, the ability to self-evaluate and negotiation skills (Martínez, 2008, p. 30). Thanks to CL, we can effectively work in these transversal skills typical of all professions in which students should be trained.

As set out above, the pursued objectives of this study are specified as follows:

- To demonstrate the need to work with active methodologies in the university classroom, and how these methods affect the quality of learning and the performance of students.
- To confirm how CL promotes the acquisition of transversal skills (personal, instrumental and systemic) that are essential in the teaching profession and which are hardly developed by other methodologies.

2. Method

The methodology underlying this research has a mixed quantitative and qualitative orientation. The mixed approach arises from the need to address the complexity of research problems in all the sciences, including the social sciences and, particularly, in educational sciences, approaching them from a holistic and comprehensive manner. These methodologies allow us to understand the educational activities in the context in which they occur and, at the same time, they allow us to provide recommendations that can be generalized to support decision-making in education policies (Castro and Godino, 2011).

Johnson and Onwuegbuzie (2004) understand that the use of mixed method is justified as a variety of methods to be applied to address issues of complex investigations. The investigation of the impact of CL on learning and acquiring skills is a matter of complex investigation, so the choice of mixed research methods may be appropriate for enhancing the generalizability of the results.

Creswell (2009, p. 18) describes mixed research methods as “the study begins with an extensive survey in order to generalize the results to a population and then, in a second phase, it focuses in quantitative and open interviews to hear the detailed views of the participants”. We have chosen this option, called instrumental enrichment by research techniques, as the use of different instruments and strategies for collecting and compiling information is supported by numerous experts (Bericat, 1998; Ruiz-Olabuénaga, 2003; Bisquerra, 2004; Sabirón, 2006). It has been used as an instrument, an *ad hoc* questionnaire, to assess CL, specifically the one developed by Gonzalez and Garcia (2007) and the team notebook. Finally, observation has been used as process, making various records of teamwork performance in the classroom.

The extracted data from the questionnaire has been treated through the SPSS Statistics 17.0.1. The descriptive statistics used were frequencies and percentages, leading to a descriptive analysis. Both observational records and the team notebook have been analyzed from a qualitative analysis, categorically.

2.1 Participants

This study was carried out at the University of Zaragoza, specifically at the Faculty of Human and Educational Sciences of Huesca, Spain. It has been implemented in the degree of primary education teaching, within the course named: Curriculum subject in different contexts, which is a mandatory course consisting in six ECTS (European Credit Transfer and Accumulation System). The two groups of students studying such course, whose number goes up to 127, have formed the sample of this research. Therefore, the sampling was intentional.

Participation, meaning attendance, has met the sample for the collection of data through observation and team notebook, amounting up to 86.6 per cent. Participation in the survey has arrived up to a 68 per cent.

2.2 Instruments

An *ad hoc* questionnaire has been used as an instrument, specifically the questionnaire to assess CL at the University of [González and García \(2007\)](#). Adapted from Students' Evaluations of Educational Quality (SEEQ) designed by [Marsh and Roche \(1970\)](#), and the Social Competence Questionnaire designed by [Torbay et al. \(2001\)](#), with a total of 25 closed answer items and 3 open questions. We used such a questionnaire because it responds to our context and because of its degree of comprehensiveness.

Also, we used the team notebook to observe the process of teamwork. During the course of the study, each team collected their thoughts on how they had worked together. In total we have analyzed 25 team notebooks.

Finally, 14 observational records were conducted throughout the entire process. To systematize the collection of information, a recording sheet was designed where the teacher wrote down the behaviour and conducts denoting collaboration, as well as the comments made by the teams about their own work.

2.3 Procedure

The developed study is based on the methodology of CL, which was defined by [Johnson et al. \(1999, p. 14\)](#) as "the didactic use of small team works, in which students work together to maximize their own learning and the one of their teammates". This methodology allowed working in the content of the subject, the methodology in the classroom, in a meaningful and experiential form.

This methodology has been used during the four months in the first year of primary education degree, with a frequency of six weekly sessions of one hour. The practical and theoretical contents of the subject were carried out during those sessions. The teachers who carried out the sessions have experience in the application of this methodology, participating in different innovation projects and transferring these innovations in the classroom. They have been working in such aspects since 2004. The students were informed of this methodology from the first day of class and a learning contract was signed to determine the commitments towards the proposed objectives. Then, teams were created.

Base teams of 4/5 people were defined. They were heterogeneous and stable, and distinct roles that have been rotating (responsible, responsible assistant or substitute, secretary and head of the material) were assigned. They also worked by using other groupings, expert teams and occasional teams, depending on the methodological strategy used.

In each session, the base team worked according to the strategy proposed by the teacher, addressing different tasks aimed at developing specific and transversal skills of the curriculum. Some of the strategies implemented are: Aronson's puzzle or jigsaw, student team-achievement divisions (STAD), research groups, Metaplan, peer tutoring, tournament learning, Phillips 66, debating, etc. It was also intended to show students a varied repertoire of CL teaching strategies in the classroom to provide models of teaching and learning beyond the traditional methodology.

Along this process, the stages of team building that defines [Torrego and Negro \(2012\)](#) are four:

1. training-orientation;
2. standard setting and conflict resolution or settlement and clarification;

3. effective group performance or productivity; and
4. end or closing.

To assess progress and the process of the team, each team had to collect their work on a team notebook – a reflexive process – and they had to define the internal rules of operation.

To assess the CL process, a questionnaire was administered and the annotations the students made in the notebook were analyzed.

2.4 Teacher's role

In EHCA, students should be the central figure of the teaching–learning process, which means that teachers should assume new roles (tutor, facilitator, guide, mediator, etc.) (Fernández, 2006). Thus, the teacher becomes a facilitator of knowledge rather than a mere transmitter of knowledge to the students, who take an active role in their training rather than simply attending class passively (Morales Vallejo, 2008).

3. Results

This section is structured around three axes. The first one analyzes the data obtained by observation, the second one includes the analysis of the team notebooks and the third presents the changes and improvements noted and found from the questionnaire.

After analyzing the data, we can suggest that the methodology developed has brought significant changes in various aspects.

First, by observing we have found improvements in:

- *Teaching processes in regard to the following conditions:* the grouping of students, the way of presenting the information to other students and the student's assessment (continuous and formative, peer-assessment and others assessment).
- *Learning process:* This led to the development of social skills (dialogue, listening, participating, assertiveness, negotiation and leadership) and a greater autonomy.

Second, from the team notebooks analysis, we have found how they have developed changes and improvements related to instrumental and personal skills from the Tuning Project in the processes of reflection. They have all actively examined the work done in the process of teaching–learning, improving the following aspects:

- *Self-regulation:* The students have had an active role in their learning. They have set goals and have conducted their behaviour towards achieving them, being forced to make various adjustments during the process. For example, "We had thought that this week we would finish the assignment and so we wouldn't have to meet again, but we have seen that we must turn around the evaluation section, so we will have to meet some time next Tuesday".
- *The commitment and responsibility:* They have been consistent with their share of work and involvement in the group. They had previously taken a position of collaboration for the work to be successful, something they are not so used. For example, "One of our internal rules of the group was to deliver work on time. We are satisfied because we are fulfilling what we agreed on".
- *Negotiation:* They have agreed on many issues and they have trusted each other, being forced to show emotional and behaviour regulation in many moments (self-control). For example, "Today we had a problem, two of the group components thought the division of tasks had to be more equitable and we had to come to an agreement. After arguing, we have divided the tasks again and we have left happier than before".

The results obtained from the questionnaire of [González and García \(2007\)](#) show the improvements obtained in the process of teaching and learning ([Table II](#)).

As it is reflected in [Table II](#), using cooperative work methodology, students report having developed different skills which correspond to the transversal competences proposed in the Tuning Project ([González and Wagenaar, 2003](#)).

First, in order of relevance (highly developed or more than 80 per cent), the greatest impact occurred in the following skills:

- *Personal skills*: These related to teamwork, interpersonal relationships and ethical commitment from the Tuning Project, which corresponds to the following areas of the questionnaire: interacting, cooperating and mutual knowledge (87 per cent); close, fluid and enriching relationship with teachers and peers (87 per cent); mutual learning among peers (85 per cent); and engagement capability (83 per cent).
- *Instrumental skills*: These related to verbal and written communication, problem-solving and decision-making and the ability to analyze and synthesize the Tuning Project, which corresponds to the following areas of the questionnaire: verbal communication (85 per cent); and arguing about their own ideas and the ideas of other people (80 per cent).
- *Systemic Skills*: These related to independent learning and motivation for quality from the Tuning Project, which corresponds to the following areas of the questionnaire: intrinsic motivation, interest and participation (80 per cent); and autonomy (80 per cent).

Second, at a moderate level (between 70 -80 per cent), there has been a greater impact on instrumental skills related to organizational skills, planning and management information capacity corresponding to the areas of the questionnaire as reflection, deliberation and planning decisions (77 per cent); discrimination and selection of relevant information (77 per cent). Also, it has been a development on the systemic ability of initiative and entrepreneurship, related to the area of the questionnaire of initiative (70 per cent).

Finally, and in a mild level (between 50 -70 per cent), there has been an impact on the development of instrumental skills related to organizational skills, planning and solving problems related to the areas of the questionnaire: time management (68 per cent); subject

Table II Improvements achieved, as reported by the students through the teaching and learning process

<i>Level of development</i>	<i>Skills</i>	<i>(%)</i>
High > 80%	Interact, cooperate and know each other (personal skill)	87
	Close, fluid and enriching relationship with the teacher and the classmates (personal skill)	87
	Mutual learning among colleagues (personal skill)	85
	Verbal communication (instrumental skill)	85
	Commitment capacity (personal skill)	83
	Arguing about their own ideas and the ideas of other people (instrumental skill)	80
	Intrinsic motivation, interest and participation (systemic skill)	80
Moderate 70-80%	Autonomy (systemic skill)	80
	Reflection, deliberation and planning in decision making (instrumental skill)	77
	Discriminate and select relevant information (instrumental skill)	77
Slight 50-70%	Initiative (systemic skill)	70
	Time management (instrumental skill)	68
	Understanding of the material (instrumental skill)	65
	Designing teaching resources (systemic skill)	58

understanding (65 per cent); systemic ability to adapt to new situations and creativity, corresponding to the design of teaching resources area of the questionnaire (58 per cent).

Finally, the results of our study show that the use of cooperative-type methodologies improves classroom atmosphere, positively influencing relations between students and between them and their teacher, as is the case in the area reported from the questionnaire: close, fluid and enriching relationship with the teacher and the classmates (87 per cent of respondents).

After the triangulation of the results, we can suggest that some of the improvements that have been made from this methodological proposal are specified in the following aspects:

- It has led to the personal and professional development of both students and teachers involved in a creative and diversified way.
- It has raised the level of commitment by students to the subject, the proactivity and entrepreneurship, the level of student learning, the “learning to learn” and the student’s motivation.
- It has developed interpersonal skills and conflict resolution strategies, such as positive relationships among students; respect for others; the ability to think and listen and the tolerance, flexibility and openness towards others; the responsibilities sharing; and developing the commitment towards the task of others.

They have learnt to organize and distribute tasks and roles to achieve a better result. In short, we can say that there have been substantial improvements which represent an achievement of the objectives set at the beginning of the study. This involves confirming that CL is a tool that can serve to promote the acquisition of transversal or generic skills that are essential in the teaching profession.

4. Conclusions/final remarks

Once the study is completed we can claim to have achieved the proposed objectives and we believe that teamwork has benefited the whole of students, allowing them to achieve higher quality learning and a more effective performance.

They have managed to acquire certain skills defined by the Tuning Project ([González and Wagenaar, 2003](#)), from high to moderate impact on the personal skills, the instrumental skills and the systemic skills.

In accordance with the expected objectives of this study, it has been confirmed by the results that CL could promote the acquisition of transversal skills as: personal skills (teamwork, interpersonal relationships and ethical commitment); instrumental skills (verbal and written communication, problem-solving and decision-making and the ability to analyze and synthesize); and systemic skills (independent learning and motivation for quality). Furthermore, it has highlighted the importance of the teaching processes of CL of the students remarking the grouping process, the way of presenting the information and the students’ assessment, as it has been reported by the observation process.

Based on the analysis of the data obtained by this study, the following conclusions have been reached:

- It is necessary to incorporate CL throughout the course to promote the acquisition of the transversal skills promoted by the EHEA such as personal skills (interacting, cooperating and knowing each other in 87 per cent of respondents; close, fluid and enriching relationship with teachers and peers in 87 per cent of respondents; and commitment capacity in 83 per cent of respondents), instrumental skills (written communication in 85 per cent of respondents; analysis and synthesis in the processes of reflection and decision-making in 77 per cent of respondents; and arguments to their own and other ideas in 77 per cent of the respondents) and systemic skills

(improvement in the autonomous learning in 80 per cent of respondents and initiative in 70 per cent of respondents), as it has been reported in the questionnaire results, as well as they have been reported in the observation registration (self-regulation, negotiation skills and responsibility and a greater autonomy).

- If the use of CL is extended to teacher-training courses, the increased number of participants will lead to the possibility of improving social and interpersonal skills as interacting, cooperating and knowing each other; close, fluid and enriching relationship with teachers and peers; commitment capacity; and the ethical commitment of the students. Students must be encouraged to further involve themselves in the CL.
- There has been an improvement in the higher-order thinking processes involved in reflection, decision-making and creativity that enhance initiative and learning to learn autonomously, as well as self-regulation processes involved in learning.
- It has been demonstrated the need to work effectively with active methodologies within the university classroom, which allows us to enhance the quality of learning and the performance of students. Teachers should foster CL development, as this area is particularly challenging in a higher education context.
- Improving the inclusion of CL methods through the designing of student team learning methods as STAD. This would lead to the collection of more data regarding the quality of learning achieved by the students using specific CL methods.
- Finally, these results have shown that the use of CL has a greater effect considering the skills developed and reported by the students.

On the other hand, as it has been noted by the results[1] collected through the observational records, it has also achieved an improvement in social and interpersonal negotiation skills, commitment and responsibility, problem-solving skills by improving learning and self-reflection processes.

In cooperative groups, students can engage in discussions in which they build and extend the conceptual learning about what they have learnt and develop shared mental models by themselves. Moreover, students acquire attitudes and values that are essential to understand the teaching profession and for a quality education.

In short, we believe that CL is a very useful and effective methodological choice, which significantly improves performance and maximizes the social and communication skills of our students. Besides, we support the idea that it is a must to introduce it in university classrooms to achieve such purposes.

Based on the above reasons, CL can be remarkably stimulating and enriching for students. Moreover, it responds to the challenges of the current society and to the new framework of the EHEA. After carrying out different innovative experiences of CL, we are committed to further deepen and promote CL projects and its dissemination through different ways.

Note

1. All these improvements have been already noted by [Johnson and Johnson \(1989\)](#) and [Slavin \(1999\)](#). These authors insisted that the use of this type of learning can increase student achievement, their intergroup relations, acceptance of students with academic difficulties and self-esteem, critical thinking, reasoning ability and creativity, among others. In addition, they get the students to learn to think for themselves, to solve problems and integrate and apply their knowledge and learning skills to it. Therefore, we agree with [Gil et al. \(2007\)](#), wherein cooperative learning allows us to a more and better development of skills and values than traditional teaching methods.

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