

Article

Cooperative Learning and Students' Motivation, Social Interactions and Attitudes: Perspectives from Two Different Educational Stages

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Abstract: The goal of the study was to contrast the effects that a Cooperative Learning implementation in Physical Education can produce in two different Educational stages: Primary and Secondary Education. A total of 179 students agreed to participate: 96 (44 boys, 52 girls) were enrolled in four Year 7 Primary Education groups (11.37 ± 0.89 years) and 83 students (38 boys, 45 girls) were enrolled in three Year 11 Secondary Education groups (15.42 ± 1.12 years). Convenience sampling was used. All groups experienced three consecutive learning units (23 sessions). At post-test, motivation increased significantly in the two groups ($p = 0.031$, $p = 0.029$), while social interaction only in the Secondary Education group ($p = 0.024$), and a significant difference between groups was also obtained in the post-test ($p = 0.034$). All effect sizes exceed the value of 0.87, which is considered large. Qualitative data showed that the teacher highlighted the importance of cooperation in Physical Education in order to promote respect for others and joint thinking in Primary Education.

Keywords: cooperative learning; attitudes; motivation; social interaction; mixed methodology

1. Introduction

Cooperative learning has been described as “one large step beyond just learning next to one another to learning with, by, and for each other” [1]. This means that students are consciously clustered in small, heterogeneous groups based on gender, race, ability and socio-economic background to work together ([2,3]. Different researchers agree on the five main elements of cooperative learning [4–6]: (a) Positive interdependence: it refers to all group members depending on one another to achieve the desired goal, (b) Promotive interaction: it represents group members' face-to-face interaction during the tasks, (c) Individual accountability: it means that every group member is responsible of a part of the group's task, (d) Interpersonal and small group skills: they include active listening, giving and receiving feedback, or praising others' efforts, and (e) Group processing: it means discussing and reflecting on the group's work.

Over the last 10 years, cooperative learning has become an increasingly used pedagogical model in Education [7]. Some of the reasons for this success have been: (a) high teacher training from teacher innovation centers, (b) great dissemination of educational experiences based on this approach, and (c) publication of resources with specific strategies [8]. This methodological approach has helped teachers try to improve the classroom climate and make learning more appealing [9]. In addition, it

encourages shared responsibility, seeking to foster intrinsic motivation for the task [10]. This increase has been even larger in Physical Education, showing benefits in the classroom climate and in the students' responsibility, and generating changes in the teaching practices [11]. However, some studies have shown the initial rejection that Physical Education teachers face when they try to introduce cooperative learning in their classes [12]. The changes that this instructional approach involve are not easily integrated by many students, who are used to a Physical Education class where dialogue and group work are not relevant [13]. That is why some individualistic, high-skilled students reject cooperative learning: it requires different social connections, and they are not ready for them.

Implementing cooperative learning in Physical Education entails addressing the subject from a different perspective, and changing its view as simple "healthism" [14]. It makes little sense to expect students to cooperate if the curricular focus is on performance. Physical education, properly conducted, can make an essential contribution to educating young people in, about and through the medium of active engagement with organized physical activities, and in so doing can enrich their lives and empower them as members of their communities [15]. Motor performance, being the axis that regulates Physical Education classes, must be used in reflexive processes that allow students to be aware of what and how they learn and who is at their side, to be able to learn more effectively with increased motivation [16]. This is closely related to the basic psychological needs associated with learning, with novelty and social relations being two variables that are related to high significance [17]. These ideas, together with the development of students' responsibility and autonomy, are what can lead them to positive group experiences [18] which, over time, generate bonding among classmates. For this reason, it is necessary to integrate contents and contexts that demand group involvement, like being diverse, as an aid to solve the different tasks successfully [19].

In a recent review, [4] found that cooperative learning can promote social interactions among students who experience this approach, and develop, among other skills, "care, concern, empathy, respect for each other, and supporting and encouraging one another to learn". Cooperating through movement will allow students to develop personal and social skills, which will be difficult to promote in other learning contexts (e.g., individualistic, competitive). In addition, it can help encourage active listening, dialogue, and consensus, decision-making and acceptance of personal strengths and weaknesses [20].

Previous research has shown the benefits of cooperative learning in Physical Education [4], but there is no existing literature comparing its implementation in Primary and Secondary Education. During adolescence, students experience different changes in the affective and social domains, which, in many cases, result in conflict and disruptive behaviors [21]. Their impetuous character, the concern for their body, the need for self-realization and self-affirmation, and the rejection from the adult's world are some of the characteristics that differentiate Secondary Education from Primary Education students [22]. The question is: can cooperative learning play a role in this situation? Physical Education is not a subject that can improve social relations, tolerance and respect between partners per se. Only the methodological approach used by the teacher will be able to lead to these changes. A Physical Education class focused on competition, individualism and low commitment to the group can lead to an ego orientation, being it socially accepted [23]. Therefore, Educational contexts that generate positive attitudes towards classmates should be generated, and cooperative learning can help.

Based on the aforementioned, the aim of the present study was to compare the effects of Cooperative Learning in two different Educational stages: Primary and Secondary Education. This goal, which has not been previously addressed in the scientific literature, will allow researchers and practitioners, to see how this methodological approach is internalized by students of different ages. The first goal was to assess the effects of a long-term cooperative learning implementation on students' attitudes towards Physical Education, motivation and social interaction. The second goal was to assess the participating teacher and students' perceptions during and after the intervention program.

2. Material and Methods

2.1. Participants

A total of 179 students agreed to participate: 96 (44 boys, 52 girls) enrolled in four Year-7 Primary Education classes (11.37 ± 0.89 years) and 83 students (38 boys, 45 girls) enrolled in three Year-11 Secondary Education classes (15.42 ± 1.12 years). All of them belonged to the same Primary and Secondary schools (respectively) located in a mid-size city in northern Spain. All the students experienced three consecutive CL units, emotional challenges, conditioning, and black-light Theatre, for a total of 27 sessions. None of the classes had previously experienced cooperative learning. The same Physical Education specialist teacher taught all groups. He earned a doctoral degree in Education and he was a specialist in the implementation of pedagogical models in Physical Education. He had nine years of teaching experience in Primary and Secondary Education, and five years in Physical Education Teacher Education. The participating teacher was blind to the research questions. Convenience sampling (natural groups) was used in [24].

2.2. Instruments

2.2.1. Quantitative

Attitudes towards Physical Education Questionnaire [25]. It contains 56 items grouped in seven factors related to Physical Education: (a) Assessment (11 items, e.g., "Learning in Physical Education is necessary and important"), (b) Toughness (six items, e.g., "Obtaining a good grade in Physical Education is easy"), (c) Usefulness (10 items, e.g., "Physical Education classes will be useful in the future"), (d) Empathy (six items, e.g., "I get along better with the Physical Education teacher than with other teachers"), (e) Management (five items, e.g., "The Physical Education teacher must use a tracksuit"), (f) Preference (four items, e.g., "I prefer to practice sport instead of watching TV"), and (g) Physical Education and Sport (four items, e.g., "Physical Education and Sport is the same thing"). A high Composite Reliability (CR) 0.88, and an Average Variance Extracted (AVE) higher than 0.50 (50.21%) were obtained. Cronbach's alpha was 0.81 with a 95% confidence interval.

Peer Motivational Climate Perception Scale. The Spanish validated version for Educational contexts of the Peer Motivational Climate in Sport Questionnaire (PeerMCYSQ) [26] was used. It contains 21 items with the following stem: "In Physical Education, most classmates..." They are grouped in two factors: (a) Task climate (12 items, e.g., "teach their classmates new things"), and (b) Ego climate (nine items, e.g., "highly-skilled students' opinion is more considered"). A high CR = 0.92 and an AVE higher than 0.50 (50.12%) were obtained. Cronbach's alpha was 0.83 with a 95% confidence interval.

Social Interaction Preference in Physical Education Scale [27]. The students responded to the question: "During the Physical Education classes ...". It contains 28 items grouped in four factors: (a) Cooperation (seven items, "I like to tell and do things that help others"), (b) Competitiveness (seven items, "I like to do things better than others"), (c) Individualism (seven items, "I like to work my way, without worrying about what others do"), and (d) Affiliation (seven items, "The best way to learn in class is to be accepted by a group"). A high CR = 0.87 and an AVE slightly lower than 0.50 (47.83%) were obtained. Cronbach's alpha was 0.78 with a 95% confidence interval.

In all questionnaires, answers were collected on a Likert scale whose score ranged from 1 (strongly disagree) to 5 (totally agree). An exploratory factor analysis (EFA) was conducted on all questionnaires, which revealed a three-factor solution with an eigenvalue greater than one. These three factors explained the total variance, once corrected and rotated the matrix component (Varimax Normalized). The initial eigenvalue for the first factor corresponded to 25.125% of the variance, the second to 23.783% and the third to 21.679%. A confirmatory factorial analysis (CFA) of the main components was conducted to evaluate the goodness of fit to the data of all questionnaires. Adequate values were obtained for the KMO index (Kaiser-Meyer-Olkin) 0.802, and the Bartlett Sphericity Test ($p < 0.05$).

This test presented a Chi-square value of 128,612 and 10 degrees of freedom. The indices obtained in the covariance matrix presented satisfactory adjustments for the RMSEA index (Root Mean Square Error Approximation) = 0.065 (values lower than 0.05 indicate a good fit, and values up to 0.08 represent reasonable approximation errors) [28]. In the CFI (Comparative Fit Index) and the GFI (Goodness of Fit Index) scores of 0.86 and 0.87 were obtained, which indicated a proper fit [29]. The three study factors were: (1) Attitudes towards Physical Education: student's perception of the subject (usefulness, coherence), (2) Motivation: students' feelings about the class (classmates' help, the way the class was conducted, reactions to success and/or failure), and (3) Social interactions: students' feelings of belonging and acceptance (being accepted/rejected).

2.2.2. Qualitative

Teachers' reflective diary: it included comments of the most relevant events from each one of the 23 sessions on three variables (they matched the three quantitative study factors): (a) Attitudes towards Physical Education, (b) Motivation, and (c) Social interactions.

Teachers' interview: The participating teacher was interviewed after the intervention program. Table 1 shows the script used to conduct the interview, which included six questions related to the three study factors.

Table 1. Basic script used in the teachers' interview.

1. Do you think that the intervention program influenced students' attitudes toward Physical Education?
2. Which ones do you consider the most relevant elements of the experience, which ones should still be worked on?
3. Do you feel that students' motivation changed? How and why?
4. Do you think that cooperative learning can help increase students' motivation?
5. What do you think about in-class social relations during the intervention program?
6. Do you think that group cohesiveness has changed?

Discussion groups. One discussion group was conducted with each one of the participating classes. Table 2 shows the script used to conduct the discussion. Questions were also linked to the three study factors.

Table 2. Basic script used in the discussion groups.

1. Do you like Physical Education? What do you like more? and less?
2. Do you consider that Physical Education is important and useful? Why?
3. What are the things that motivate you the most in Physical Education?
4. When you are in the Physical Education class, do you feel like playing sports after school? Why?
5. Is it more satisfying to overcome a task in a group or individually? Why?
6. Are your classmates important for you to learn in Physical Education? Why?

Both in the interview and the discussion groups, open questions were used to allow participants to go deep in their answers. This element, added to a climate of trust and serenity, helped conduct both assessment procedures [30]. The aim was to give voice to all participants.

2.3. Design and Procedure

The study followed a quasi-experimental pre-test, post-test research design with natural groups. The methodology used was mixed: quantitative and qualitative. This complementarity helped provide a global view of the project, as well as greater understanding of the results.

First, permission was obtained from the main researcher's University Ethics Committee, as well as from the participating schools. Subsequently, an informed written consent from all the participating students' parents was obtained. Finally, the students completed the questionnaires anonymously in a Physical Education session (before and after the intervention program). A member of the research

team conducted the whole process. Students were encouraged to answer the questions as truthfully as possible, and they were assured that their answers would not affect their Physical Education grades.

All Primary and Secondary Education groups experienced the same three consecutive learning units (two hours a week during 14 consecutive weeks) based on cooperative learning [19,31,32]. The same experienced teacher taught all groups, respecting the principles of positive interdependence, promotive interaction, individual responsibility, interpersonal and small groups skills, and group processing/reflection [33]. The three Educational units developed were: (1) Emotional challenges (eight sessions): the students experienced cooperative group challenges, which included some risk (e.g., throwing themselves on a corridor of ropes held by their colleagues, pass over pikes placed horizontally one meter above the ground). Once experienced, students, in groups, invented others similar for their classmates, the only rule was that the whole class had to be able to perform them successfully. This unit helped build group cohesion through icebreakers, trust activities and coop-play [31,34] (2) Physical conditioning (eight sessions): the goal was to work on strength, endurance, flexibility, and speed using cooperative learning techniques such as collective score (all scores of all class members are added for a collective/global score) and pairs check (students check each other's performance) [35,36], autonomy was also encouraged through student-designed tasks with the following characteristics: (a) all group members must participate actively, and (b) roles and responsibilities of each group member must be highlighted. (3) Black-light Theatre (seven sessions): using a piece of black fabric and neon lights, students worked on body expression through different activities (e.g., represent numbers with the hands, parades, daily life activities, short stories), the final goal was to create a dramatization in small groups [37], cooperative learning techniques such as think-share-perform (students have to solve a problem thinking, sharing, negotiating and performing) and jigsaw (each student is responsible for learning and performing a part of the content and teach it to the groupmates) were used [31,35,38].

2.4. Data Analysis

2.4.1. Quantitative

All analyses were conducted with the statistical package SPSS (version 22.0). The Kolmogorov-Smirnov test ($n > 50$) showed that the sample was normally distributed, which allowed researchers to use parametric tests. Therefore, a mixed two-way repeated-measures analysis of variance (ANOVA) for independent groups was conducted.

2.4.2. Qualitative

All data extracted from the diary, the interview and the discussion groups were explored via thematic content analysis [39] and constant comparison [40]. Content analysis focused on the search for patterns in the text, coding the extracts matching the crossed patterns [41]. Reliability was supported through continuous feedback and participatory analysis by all researchers [42]. The categories that emerged from the data are presented in the results section and they are supported with several text examples [43]. They matched the factors extracted from the quantitative analysis, which guarantees the complementarity of the data and the depth in the subject of the study [44]. For the entire analysis, the WEFT QDA computer program was used. The following coding of the instruments was used: reflective teacher diary (RTD), interview with the teacher (IT), initial Primary/Secondary discussion group (IPDG/ISDG), Primary/Secondary final discussion group (PFDG/SFDG).

3. Results

3.1. Inferential Analysis: Mixed Two-Way Repeated Measures Anova

At pre-test, there were no significant differences between groups in any of the three factors assessed (Table 3). Regarding pre-post comparison, motivation increased significantly in the two groups ($p = 0.031$, $p = 0.029$), while social interaction only in the Secondary Education group ($p = 0.024$),

and a significant difference between groups was obtained in the post-test ($p = 0.034$). All effect sizes exceed the value of 0.87, which is considered large [24].

Table 3. ANOVAs on the different variables for each of the groups.

	PRE-TEST			POST-TEST			f^1	f^2
	Mean	SD	Var	Mean	SD	Var		
	Primary Education group (A)							
F.1. Attitudes towards PE	3.97	0.52	0.27	4.28 ^a	0.31	0.09	-	-
F.2. Motivation	3.65	0.41	0.16	4.34 ^{*a}	0.38	0.14	0.89	-
F.3. Social interactions	3.98	0.72	0.51	4.11 ^{*a}	0.41	0.16	-	-
	Secondary Education group (B)							
F.1. Attitudes toward PE	3.88	0.65	0.42	4.25 ^a	0.26	0.06	-	-
F.2. Motivation	3.54	0.39	0.15	4.10 ^{*a}	0.35	0.12	0.90	-
F.3. Social interactions	3.75	0.65	0.42	4.68 ^{*b}	0.23	0.05	0.92	0.88

Note: PE. Physical Education; SD: Standard Deviation; Var. Variation; * pre-post differences at level $p < 0.05$; Different superscripts between groups indicate significant differences at the level $p < 0.05$; f^1 : pre-post size effect; f^2 : post-test effect size (Secondary Education vs. Primary Education).

3.2. Qualitative Results

All the information was grouped into three categories: the same factors obtained in the quantitative analysis. Each category is presented below with the number of meaningful segments, and showing the most representative.

Attitudes towards Physical Education (245 meaningful segments). In both study groups, there was an evolution of the students' attitudes towards Physical Education. In Primary Education the terms "solidarity" and "respect for others" emerged, while in Secondary Education "reflection" and "values" were mentioned:

"The two study groups have a good attitude towards Physical Education. Cooperative learning is helping me to see how secondary education students' involvement increases, in Primary Education, students don't care about winning or losing, they like to help others" (RTD)

"What I highlight more about cooperation in Primary Education is respect for others and think more for the group [...]." *"In Secondary school I have observed how students go a step further, reflecting on the importance of assuming team responsibilities"* (IT)

"In the beginning, we did not understand why we did not practice sports, which is what we really like... Then, you realize how important is to do your best to get things done in your group" (SFDG)

"At first, I did not get along with Diego [student] because he always was arrogant [...]. Now, we are friends and we have taught each other things" (PFDG)

Motivation (237 meaningful segments). The two groups had higher motivation at the end of the intervention program. The Primary Education groups valued more the games and the novelty of the activities, while the Secondary Education groups emphasized the feeling of belonging to the group:

"With the emotional challenges, the class increased their motivation [...]. Sometimes they [students] did not respect turns or the participation of others, but none wanted these playful and innovative activities to finish" (RTD)

"In Primary Education, they [students] usually have high motivation from the beginning, but I think that our work in Physical Education must be to focus their bodily experiences towards group satisfaction and autonomy". *"In Secondary Education, things change [...]. It is common to find unmotivated students with bad experiences with cooperative learning, I [teacher] have seen how they [students] find physical activity practice useful"* (IT)

"I loved many things this year like the mats' challenge, the strength and speed games, or the black-light [...]. Together we [students] have managed to do everything " (PFDG)

"Honestly, I do not see how PE can be useful I will not be an athlete in the future" (ISDG)

"I have realized that when we experienced these different units you can achieve what is propose, and if it is in a group, much better" (SFDG)

Social interactions (226 meaningful segments). The teacher emphasized in his diary the improvement that the Secondary Education groups experienced in their social relations, and the interview highlighted the level of social cohesion reached by the groups. The initial discussion groups showed how the interpersonal relationships were not good among Secondary school students. Something that changed substantially at the end:

"In the beginning, the Secondary Education groups did not fit well into the cooperative learning dynamics, since students did not care about each other... This attitude changed a lot as we continued today with the emotional challenges" (RTD)

"The Primary Education groups participate in class more than the Secondary Education ones. This allows me [teacher] to work on their selfish attitude and the rejection of others... With them [students] the use of play works great". "In high school it is more complicated to modify some negative behaviors among some students... They [student] changed their attitude when they [students] had to solve challenges in groups, share scores and perform joint figures in black-light Theatre" (IT)

"I really do not know why everyone should get along well in Physical Education, in life, it is not always necessary to be friendly with everyone" (ISDG). *"I recognize that I have changed the way I see Physical Education after these experiences..." "You can still be as good as before, but now working as a team..." "Together we have achieved things that would have been impossible to achieve individually"* (SFDG)

4. Discussion

The aim of the present study was to compare the effects of Cooperative Learning in two different Educational stages: Primary and Secondary Education. The first goal was to assess the effects of a long-term cooperative learning implementation on students' attitudes towards Physical Education, motivation and social interaction. Results showed that only Secondary Education students significantly improved their social interactions after the intervention program compared to their pre-test scores, but also to their Primary Education counterparts. On the other hand, both groups obtained significant improvements in motivation. The second goal was to assess the participating teacher and students' perceptions during and after the intervention program, and the results highlighted the importance of cooperation in Physical Education to promote respect for others in Primary Education students, and feelings of belonging to a group and group responsibility in Secondary Education students.

Quantitative and qualitative data showed that students' motivation significantly increased in both age groups after experiencing Cooperative Learning. This increase is noteworthy among Secondary Education students because motivation towards school tends to decrease at this stage [45]. These results are in line with those obtained in previous studies where a similar significant increase in Secondary Education students' intrinsic motivation was observed [31]. Both studies indicated that when Cooperative Learning is implemented on a long-term basis, it can successfully promote students' motivation in class. Some practitioners believe that the implementation of a Cooperative Learning program can generate motivation among students because of the lower motor demand of the cooperative tasks [46,47], but results from the present and the previously mentioned study does not support this hypothesis. Cooperation and motor skills seem to be closely linked to motivation, as long as they integrate responsibilities, group roles, and interpersonal skills such as listening to

others and empathy as fundamental elements in the tasks [4–6,13,31]. Other studies, such as [48], reflect how students do better academically when there is a motivational, home-oriented climate. The learning climate created by the teacher and the student's active participation have been identified as fundamental to increase students' motivation [49]. Cooperative Learning climates, like the ones promoted in this study, can boost students' motivation in Physical Education since they have been found dependent upon three elements: cooperation, participation, and respect [50]. The three were fostered by the different task experienced by the teachers (e.g., group challenges, icebreakers, trust activities). Qualitative results reinforced quantitative data. Regarding motivation, Primary Education groups highlighted the games and the novelty of the activities, while the Secondary Education students underlined the feeling of belonging to the group (social relations). As indicated by [51], gameplay is an essential part of Physical Education, and it should always be present in class. This is even more important in Primary Education since it can act as a catalyst for creativity and a promoter of teamwork. In Secondary school, it is also necessary to use movement as a tool to favor social relationships, self-esteem, physical self-concept and critical reflection of what is learned [52].

In this same trend, results also showed a significant increase in students' social interactions, but only at the Secondary Education level. Adolescence is a key stage where personality is being re-defined, and social relations are complicated because of increased competitiveness and convulsed friendships [53]. Results from the present study showed that Cooperative Learning can play an important role to overcome egos, create bonds among classmates and develop paths for an adequate social development [54]. This holds special relevance to reduce current negative issues such as bullying or disruptive, violent or sexist behaviors in school [55]. Learning has been found to promote learning in all four domains [4], including social learning. These aspects are perfectly applicable to the sports field, where the group climate is fundamental to achieve positive results. Some experiences indicate that athletes perceive a greater climate of mastery, valuing effort as the main cause of success [56]. One of the fundamental elements of Cooperative Learning is the combination of individual and group achievement, which can help build a positive perception towards the group, and the development of interpersonal skills such as respect to peers and tolerance, which can contribute to socialization [57]. Classroom frameworks like the one created through Cooperative Learning move away from competitive models where individual performance prevails over the success of the group, often excluding the less skilled or less accepted individuals. Moreover, social interaction is one of the most important factors linked to learning [58]. Therefore, Cooperative Learning can influence student's academic performance creating social bonds among groupmates. This is even more important in times where everything seems to collapse, like adolescence. Regarding social interaction, Qualitative results reinforced quantitative data. A positive evolution of the Secondary Education students' social relations were also highlighted. Activities like group challenges probably helped achieve this positive outcome. Task-oriented learning climates, like the ones promoted by Cooperative Learning, have been linked to students' intrinsic motivation and satisfaction [59], and they should be promoted, especially among Secondary Education students.

5. Conclusions

The main contribution of the present investigation has been to compare the effects of a long-term implementation of a cooperative learning program in Physical Education on students of two different educational stages: Primary and Secondary. Results showed that only Secondary Education students significantly improved their social interactions after the intervention program compared to the pre-test, but also to their Primary Education counterparts. On the other hand, both groups obtained significant improvements in motivation. Both, the participating teacher and the students highlighted the importance of promoting cooperative learning in Physical Education to foster respect for others in Primary Education students, and feelings of belonging to a group and group responsibility in Secondary Education students. For future research, it would be of special interest to contrast these results with other countries, checking how cooperative learning is perceived in one way or another

depending on the curriculum in which it is contextualized. Further research is needed on a pedagogical model that has such social significance, both in physical education and in the rest of the subjects.

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