Cooperation in Solving the "Problem of the Week" in a 3rd Grade Glass

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Abstract

For a quality education, work in the classroom should favor practices of cooperation, collaboration and solidarity, promoting the development of intellectual, social and moral skills in students [1]. In analogy, the present investigation aims to study the acquisition of cooperation and collaboration skills in the area of Mathematics in solving the "problem of the week" in a 3rd grade class. This study was developed with a group of 25 students from a 3rd year class and had the specific objectives of (i) characterizing students' conceptions of cooperative work, (ii) identify students' cooperation and collaboration skills in "problem-solving" situations in the classroom and (iii) describe the evolution of students' cooperation and collaboration skills in "problem-solving" situations in the classroom. The methodology used was of a qualitative nature. As data collection techniques, participant observation was privileged, guided by analysis grids, designed according to the specific objectives of the study; to semi-structured interviews; to Focus Group interviews. For data processing, categorical content analysis was performed. The results obtained showed that the implementation of the checklists, as well as the reflections carried out after the sessions of solving the "problem of the week", enhanced and improved the skills of cooperation and collaboration between students, proving to be enhancers of the learning with peers.

Keywords: *Cooperative learning; Problem of the Week; Self and hetero assessment.*

1. Introduction

Pedagogy must be organized based on the principles of cooperation, collaboration and solidarity. It should promote students' intellectual, social and moral capacities to work together and transform the world with empathy and compassion [1]. Johnson, Johnson and Holubec (1993) described cooperative learning as a method in which small work groups are used, with the aim of enhancing the student's own learning, as well as that of other colleagues, since there is constant sharing [2]. Thus, it was considered pertinent to apply strategies that could intensify cooperative skills in students. It is also important to adopt these cooperative learning strategies in formal education, referred to by Lopes and Silva (2009), who support that they are beneficial not only for obtaining gains in relation to the teaching-learning process itself, but also in preparing individuals for future situations in the work environment [3]. We should also consider the relevance of self and hetero assessment throughout the entire process. This constant reflection on their own work and the work of their peers makes the student aware of what he is doing, in order to be able to evolve. Niza (1998) highlights this gain in awareness in cooperative learning, assuming that the success of a student contributes to the success of all the members of the group, which he concludes by explaining that this mechanism of social facilitation becomes more effective the more conscious are the cooperating members of this structural rule that unites them [4].

However, there were some aspects observed in the classroom in which this investigation took place that prevented its full realization, namely: the lack of awareness of what cooperation actually is and of how cooperation should work.

2. Methodology

Taking into account the aspects that were identified in the classroom, the following questions were raised: (i) what are the students' representations of cooperation before and after the intervention?, (ii) What are the students' representations of cooperation in solving the week's problem before and after the intervention?, (iii) how did the regular self- and hetero-assessment of cooperation skills carried out after the problem of the week help in their development and in the effectiveness of the resolution?..

Furthermore, the specific objectives are to (i) highlight self and hetero assessment of cooperation skills included in the checklist as promoters of improved cooperation and solving of the Math week's problem; (ii) understand the students' representations of cooperation, in general and in reference to solving the week's problem, before and after the intervention. A qualitative methodology was followed, taking into account the procedures close to the research-action methodology. Thus, in this case it is intended to improve the moments of cooperation and enhance student involvement in those moments, developing in them the awareness of the importance of these moments and its benefits for them. This is therefore part of a paradigm of critical action-research, as referred by Coutinho et al. (2009), since the researcher has a moderating role in the process and "the group collectively assumes responsibility for the development and transformation of the practice" (p. 365) [5]. As data gathering techniques, survey by questionnaire, *focus group* interview, participant observation and documentary research are privileged. The research was held following 3 major moments according to the following design:

- Pre-intervention: application of a survey by questionnaire to the group of students; Collective moment to return/disclose the questionnaire results and agree on changes to the week problems moments with a view to its improvement; Conception of support instruments for the week problem moments, agreed and developed with the students.
- Intervention: Implementation of the combined amendments and the week problems support and regulation instruments built; Registration of student's development.
- Post-intervention: focus group interviews with the students and a semi-structured interview with the class teacher.

For the data analysis, we resort to content analysis, following the assumptions of Bardin (2013) [6]. The present study was carried out in a private institution located in the metropolitan area of Lisbon. It involved the participation of 25 students from a 3rd year class of Primary School, as well as the class's teacher cooperation.

3. Results

Regarding the results of this investigation, the evolution of the students' conceptions of cooperation is highlighted. The comparison between the results of the initial questionnaires and the final questionnaires shows that initially the students were not aware of what cooperation is, while at the end of the investigation they showed other perceptions on the subject, managing to explain what cooperation is actually meant to be. Considering the self and hetero assessment, it was quite important in regulating the objectives, since a grid was filled in every week and a reflective approach was taken on the sessions and on the way in which the students were cooperating. When comparing the six evaluation grids on cooperation, a positive development is highlighted in view of the intended objectives of cooperation. Furthermore, the class teacher agreed that the students have, indeed, developed their conceptions on cooperation and that the self and hetero assessment grids and the weekly reflective discussions were crucial to their development. Therefore, regarding the first objective "highlight self and hetero-assessment of cooperation skills included in the checklist as promoters of improved cooperation and solving of the Math week's problem", the results point to the usefulness of the checklists and self and hetero assessment grids in promoting cooperation skills and, most importantly, in urging a reflexive process that made students actually think about what cooperation really is. It allowed them to put their role and their peers' role into perspective whenever they work together in pairs to solve the problem, how each of them was truly involved in it and their contribution to the pair's success. Concerning the second objective "understand the students' representations of cooperation, in general and in reference to solving the week's problem, before and after the intervention", it can be stated that the participants of this study showed a significant improvement on their views on cooperation, which in turn aided them in creating mechanisms to solve the problem more efficiently with their peer's cooperation.

4. Conclusions

Through the content analysis carried out on the questionnaire surveys, as well as on the final interviews, it was verified an evolution regarding the students' conceptions about cooperative learning. Initially, students expected that by working in small groups, they would already be cooperating. Throughout the explicit process in this study, we can see that these misconceptions were corrected, since the students in the final interviews already presented a more conscious discourse about cooperation. Regarding the third question, it is worth highlighting the positive development on the part of the students, with regard to cooperative learning, since they improved the selected skills, present in the checklists, through the five essential elements of cooperation: positive interdependence, individual and group responsibility, nurturing interaction, preferably face-to-face, and group process or group

assessment. It was possible to observe the entire process of the students, through the content analysis of the completed checklists, as well as the weekly reflections. This made it possible to gain awareness about one's own work, as well as about the work of others, ideas mentioned in the final interviews, both with the students and the head teacher.

In view of the research results, it is imperative to highlight the added value of building an instrument, i.e., - checklist applied to students -, which contains the main skills of cooperative learning, showing flexibility in its use. This list was applied when solving the Math's problem of the week in pairs, but it could also be applied at another time whenever there is cooperative work. Nonetheless, it is considered that it can always be improved and adapted to the needs of each group. Although cooperation in a pair/group can be hard and sometimes leads to uneven involvement levels, this study hints on ways it can be regulated and developed and helps spark the discussion on its importance.

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