Cooperative Learning
An Innovative Practice for Enhancing Leadership and Decision-making Skills through Science Teaching

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Abstract

In the present era of globalisation, where more stress is on a skilled workforce, opportunities for our students often depend as much on their communication and collaboration skills as they do on pure academic skills. This requires quality education and an important factor that affects the quality of education is the teaching-learning process. Quality management of the teaching-learning process demands innovative methods and experiments to be brought into our classrooms. It should focus on the all-round development of the learner. One such strategy promoting this aspect is Cooperative Learning (CL). CL has five essential elements: positive interdependence, face-to-face promotive interaction, individual accountability, appropriate use of collaborative skills and group processing. Collaborative skills include leadership skills, communication skills, trust-building skills, decision-making skills and skills of resolving conflicts. This paper focuses on how cooperative learning environment fosters development of collaborative skills of leadership and decision-making among Class 7 students through science teaching.

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Introduction

In the present era, globalisation has made its impact on all sectors of the society and education is no exception. What is needed at the hour is a globally competent workforce. Learners need to be having global skills that would help them survive and compete in the global world. This stresses the importance of quality education and an important factor that affects the quality of education is the teaching-learning process. This calls for a change in the present teaching-learning process. We need to come up with innovative and quality teaching methods that would help in the all-round development of learners. Today, opportunities for present generation students often depend as much on their communication and collaboration skills as they do on pure academic skills. The changing scenario of workplace requires responsibility and self-management, as well as interpersonal and project management skills that demand teamwork and leadership. According to UNESCO (1996), children should be taught to understand other people's reactions by looking at things from their point of view.

From early childhood, education should focus on the discovery of other people in the first stage of education. In the second stage it should encourage involvement in common projects. According to the National Curriculum Framework (NCF)–2000, at the upper primary stage children endeavour to establish an identity of their own (NCERT, 2000). The process of identity formation requires taking into account one's own view as well as the views of others and of the society. Thus, the importance of peer group increases considerably. It also stresses on promoting constructivist approach in classrooms which leads to learners having autonomy for their own learning and opportunities for peer collaboration and support. Thus one of the essential tools for education in the 21st century must be a suitable forum for dialogue and discussion. One such strategy promoting this aspect is Cooperative Learning (CL). The present study focuses on the effectiveness of Cooperative Learning as a strategy for improving collaborative skills of leadership and decision-making of Class 7 students while teaching science.

Review of Related Studies

CL is not only an instructional technique for increasing student achievement but is also one that has important benefits for a wide array of affective and interpersonal outcomes. Thomas (1995) found that individuals in cooperative groups exerted social pressures on one another to achieve. Ryan and Wheeler (1977) found that students who had studied cooperatively made more cooperative and helpful decisions in a simulation game than students who had studied competitively. Bridgeman (1977) reported that students who had worked cooperatively using Jigsaw technique were able to take the

perspective of another person better than the control students. Shachar (2003) reviewed eight studies that investigated children's academic achievement and social behaviour in elementary and high school students. It was found that children from all three ability levels (high, medium, low) benefitted from CL and these benefits included academic and social gains. Ryan, Reid and Epstein (2004) also found that CL experiences enhanced the development of positive social attitudes towards other group members in students with emotional and behavioural disorders.

A study by Battistich and Watson (2003) revealed that CL experiences enhance the development of positive social attitudes towards other group members. Kishore (2012) also found that social acceptability of students increased after undergoing CL. From the above findings we can conclude that CL may enhance the kinds of pro-social behaviours that are needed in the present globalised society where the ability to get along with others is becoming more and more crucial, thereby strengthening the need to promote CL as an instructional strategy in our educational institutions.

Cooperative Learning

According to Johnson and Johnson (1994), cooperative learning is an instruction that involves students working in teams to accomplish a common goal, under conditions that include the following five essential elements.

1. **Positive interdependence** — Team members are obliged to rely on one another to achieve the goal. If any team member fails to do his/her part, everyone suffers from the consequences.
2. **Individual accountability** — All students in a group are held accountable for doing their share of the work and for mastery of all of the material to be learned.
3. **Face-to-face promotive interaction** — Although some of the group work may be parcelled out and done individually, some must be done interactively, with group members providing one another with feedback, challenging reasoning and conclusions, and perhaps most importantly, teaching and encouraging one another.
4. **Appropriate use of collaborative skills** — Students are encouraged and helped to develop and practice trust-building, leadership, decision-making, communication and conflict management skills.
5. **Group processing** — Team members set group goals, periodically assess what they are doing well as a team, and identify changes they will make to function more effectively in the future.

There are many CL techniques that can be used in classrooms. In the present study, only six cooperative learning techniques were used out of the many mentioned. They are Jigsaw, Student Team Achievement Division (STAD), Group Investigation, Team Game Tournament (TGT),

Round Robin Brainstorming and Think-Pair-Share.

Objective of the Study

To study the effectiveness of strategy based on CL on collaborative skills like leadership and decision-making of Class 7 students.

Hypotheses of the Study

1. There will be no significant difference in the collaborative skill of leadership of students before and after implementation of cooperative learning.
2. There will be no significant difference in the collaborative skill of decision-making of students before and after implementation of cooperative learning.

Explanation of Terms

Strategy based on CL

The present study used a strategy based on cooperative learning in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. The strategy took care of the five essential elements of cooperative learning and the techniques of cooperative learning like Jigsaw, STAD, TGT, Group Investigation, Round Robin Brainstorming and Think-Pair-Share. And the same was linked with identified content areas of Class 7 science and accordingly lesson plans designed.

Leadership and Decision-making Skills

The present paper focuses on skills of leadership and decision-making coming under collaborative skills which is the fourth essential element of cooperative learning. In the present study, it refers to the basic simple leadership and decision-making skills which can be developed in students through cooperative learning techniques while engaged in science learning.

Delimitation of the Study

The study was delimited to government English medium upper primary schools.

Population and Sample

All Class 7 students (approximately 8,400 students) of Ernakulam district formed the population of the study. Non-probability sampling technique, purposive sampling, was used. Thirty-six students from a government English medium school following Kerala State Board syllabus formed the sample of study.

Tool

A five-point rating scale was developed for assessing collaborative skills of students in cooperative learning (1–never, 2–rarely, 3–occasionally, 4–frequently and 5–always). For leadership skills the following five items were included — Performing assigned role and helping others to do so; Involving, valuing and recognising contributions of all team

members; Effectively managing time; Summarising results and next steps before finishing; and Maintaining focus and keeping to the point in conversations. For decision-making skills, the following three items were included—pulls together all ideas into a single position, defends/rethinks ideas relating to the group's goals and directing the group in reaching consensus. Only few items mentioned above were included because students were assessed in between their learning of science. This was to assess the very basic leadership and decision-making skills that would develop when students were learning science and involved in science activities during their regular science classes only.

Data Collection

Data was collected for one term of the year, i.e., six months. In one term there are five chapters to be taught in science. Before implementing CL, the students were rated on these skills. Then the respective five chapters in science were taught using the strategy based on cooperative learning techniques. They were also rated after each chapter and finally at the end of all chapters.

Data Analysis

Rating scale was used to assess students. Scoring was done accordingly and the corresponding average means during each rating was found. A graph was plotted for each of the skill using the mean values of the skills corresponding to each rating (Figures 1 and 2).

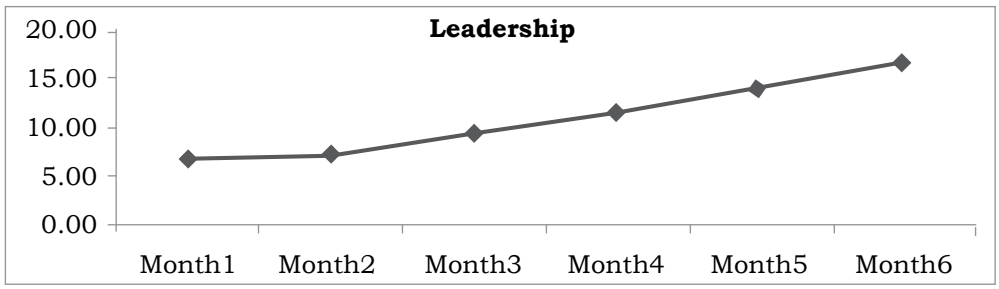

Figure 1. Leadership

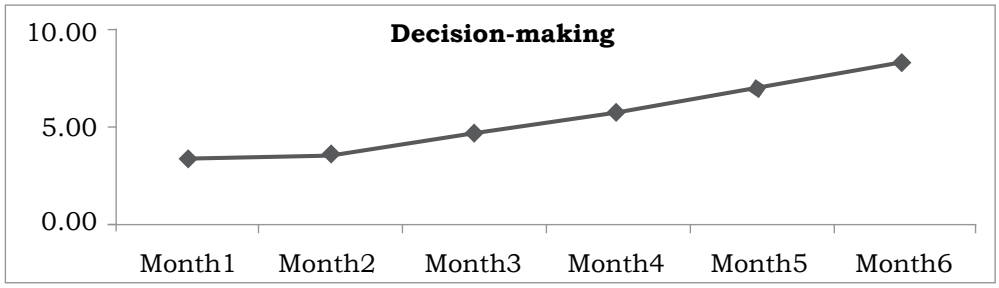

Figure 2. Decision-making

The development of the essential elements was thus seen but in order to see if the increase is significant or not, the Wilcoxon Signed Rank Test was used (Tables 1 and 2). The Wilcoxon Signed Rank Test is the non-parametric test used to compare two sets of scores that come from same participants. It is used in studies that gather before and after measurements where interest focuses on the difference between the observations for each individual. From the six ratings the initial and final rating was used. The results are given below. In this test, if p-value obtained is less than 0.05 the null hypothesis will be rejected.

Table 1
Leadership

	Z-value	**p-value**
Performing assigned role and helping others to do so	-5.352	0.001
Involving, valuing and recognising contributions	-5.345	0.001
Effectively managing time	-5.489	0.001
Summarising results and next steps before finishing	-5.436	0.001
Maintaining focus and keeping to the point	-5.558	0.001
Leadership	-5.252	0.001

From Table 1, it can be seen that the p-value is less than 0.05. This implies that the null hypothesis "There is no significant difference in leadership skills of experimental group students before and after cooperative learning" is rejected.

Table 2
Decision-making

	Z-value	**p-value**
Pulls together all ideas into a single position	-5.466	0.001
Directing the group in reaching con-sensus	-5.242	0.001
Defends/ rethinks ideas relating to the group's goals	-4.975	0.001
Decision-making	-5.248	0.001

The null hypothesis formulated here was "There is no significant difference in decision-making skills of experimental group students before and after cooperative learning". The p-value obtained is less than 0.05 and thus the null hypothesis is rejected.

Findings of the Study

- It was found that there was a significant difference in leadership skills of students after undergoing cooperative learning. Students developed leadership skills in them after learning through cooperative learning techniques and the improvement was significant.
- There was a significant difference in decision-making skills of students before and after cooperative learning. Students developed decision-making skills

after implementation of cooperative learning. They showed a significant improvement in skill of decision-making after learning through cooperative learning techniques.

Discussion

The Wilcoxon Signed Rank Test clearly indicates that there was a significant increase in leadership skills of students after undergoing CL. Initially students performed their assigned roles but did not give attention to how and what their group members performed. They did not consider it important to involve, value and recognise the contribution of their group members. Many a times they could not maintain focus and keep to the point of discussion. They would deviate into other topics. As a result, time management was not possible and they could not summarise their results before finishing. It was however seen that while learning through CL techniques, these aspects of students started undergoing change and by the end of the term they portrayed leadership skills as was desired. Along with performing their assigned roles, they also helped their group members to do so and even start involving, valuing and recognising the contributions of their group members. During group activities they started managing time effectively by maintaining focus on the topics of discussion. It also helped them in summarising results and steps before finishing their group work.

There was a significant increase in decision-making skills of students after undergoing CL and this was supported by the results of Wilcoxon Signed Rank Test. In the beginning, students were hardly able to relate and direct all ideas into a single position. They never defended or thought again on ideas relating to their group's goal. As CL progressed, this situation started changing and it could be seen that students started directing their group in reaching consensus. They started defending and rethinking ideas relating to their group's goals and started directing all ideas into a single position thereby showing improved signs of decision-making. These findings go in line with the findings of many studies. A study by Hertz-lazarowitz, Sharan and Steinberg (1980) showed that students who had experienced Group Investigation made more altruistic choices than the control students. It was seen that when students who had worked in cooperative groups were reassigned to new groups for an experimental task, they cooperated better and their groups had higher productivity than groups made from the control classes. Ryan and Wheeler (1977) found that students who had studied cooperatively made more cooperative and helpful decisions in a simulation game than the students who had studied competitively. According to Slavin (1995), two of the most important components of students' self-esteem are the feeling that they are well-liked by their peers

and the feeling that they are doing well academically. CL methods affect both of these components, and thus, CL could in fact increase students' self-esteem. Students' beliefs that they are valuable and important individuals are of critical importance for their ability to withstand the disappointments of life, to be confident decision-makers, and ultimately to be happy and productive individuals.

Conclusion

The study revealed that students significantly improved on collaborative skills like leadership and decision-making while learning science through cooperative learning. Engaging primary students in such learning activities will help build the basic skills of leadership and decision-making and from this advanced skills can then be developed in higher classes using professional activities and training. Implementing CL and assessing students in CL, however, needs a lot of patience and time and is not an easy task. Syllabus should be framed in such a way that it gives ample scope for implementing CL along with being able to be completed on time. Policy-makers and school authorities should see to it that appropriate tools needed for assessing students in CL be designed by a panel of experts and be given to teachers of all schools. Teachers should also be given training for constructing valid tools for CL and its five essential elements during workshops and training programmes. This would help reduce burden of teachers and also maintain uniformity in assessments made by all teachers. Teachers new to CL can start with those techniques of CL with which they feel most comfortable. Quality education can be achieved only with quality curriculum transaction and hence it is essential to gear up our education system using innovative initiatives. Using cooperative learning in our classrooms will definitely be a step in this regard.

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