



**AN CHOMHAIRLE MHÚINTEOIREACHTA**  
*The Teaching Council*

## **The effect of Cooperative Learning on Academic Achievement and Social Interaction in the Mathematics classroom**

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### **Overview of Research**

This research focussed on the implementation of Cooperative Learning (CL) in a first year Mathematics classroom. The model of CL chosen was that developed by Professors D.W. and R.T. Johnson of the Cooperative Learning Centre at the University of Minnesota. The research sought to investigate the claims that CL increases academic achievement and raises self-esteem.

### **Rationale and Aims**

International studies demonstrate a strong correlation between the implementation of CL and academic achievement. However, the researcher noted that there is limited research on this topic in an Irish context, and that provided a rationale for her study.

The problem of the significant number of students failing Mathematics has been causing serious concern in Ireland. The problem of student subject specific self-esteem with regard to Mathematics has also been causing disquiet. NCCA reports have expressed unease with regard to the effectiveness of teaching methodologies in Mathematics classrooms. These significant problems are being compounded by the advent of newcomers and the integration of students with special educational needs. They provided further rationale for the study, which aimed to investigate the extent, if any, to which CL could address them.

### **Design and Methodology**

An action research approach was taken whereby the researcher implemented CL in a first year classroom. The results were then compared with a control group which was taught by traditional means. Implementation involved forming pupils into learning teams (pairs). These teams were then trained in teamwork skills. Soft skills such as listening, explaining, summarising, correcting, helping were taught using a T chart 'looks like/sounds like' methodology. Other skills such as using quiet voices and sitting face-to-face were also taught alongside the academic content.

Positive Interdependence was built into the teams by ensuring that they shared resources, rewards, and goals. All students shared leadership of the teams as leadership roles were distributed. Both academic work and leadership roles were structured so that pupils took responsibility for their own and each other are learning. Students reflected on and processed how well they were working as a group.

The teacher acted as teacher/researcher. As she implemented CL in the classroom she used a number of research instruments to evaluate its effects. Academic achievement was measured by comparing the experimental group and the control group at the beginning and end of the study using the MALT 13 standardised Mathematics test. Common monthly tests were also administered to both groups and compared. A common Christmas test was also administered to both groups.

The researcher also used a personal reflective journal as she observed student interactions during the course of the study. Structured and unstructured observation was used. A student questionnaire was also distributed at the end of the study and the written processing sheets used by the students to reflect on the quality of their cooperation were also analysed.

As both groups (experimental and control) included newcomer pupils and pupils who had been assessed for learning difficulties, the effects of CL on these two distinct groups were also examined.

## **Findings**

The findings of this study were in line with international research.

### *Quantitative Results*

Students in the experimental group outperformed their counterparts in the control group. This finding held true for students in all ability ranges.

The standard deviation for the experimental group decreased over the course of the study. This resulted from significant improvement in the results of students in the mid-to-low ranges while the high achieving students continued to achieve.

### *Qualitative Results*

Findings in the experimental group showed an increase in positive and supportive social interactions. On task behaviour and helping interactions also increased. Meaningful friendships developed and both the pupils who had been assessed for learning difficulties and the newcomers were supported and integrated into the class. High achievers found satisfying roles as group leaders and developed team skills.

An interesting finding was that the groups that demonstrated the highest levels of cooperative skills also attained highest in class tests.

Newcomers and students with learning difficulties were observed to consistently receive support. A significant finding is that the students with learning difficulties were successfully integrated into the class and did not require learning support. Learning support was needed in the control group. One pupil diagnosed with Aspergers syndrome demonstrated increased levels of social engagement. Other students were observed to develop an appreciation of the difficulties experienced by him. A high ability student with poor social skills was observed to benefit significantly as his skills and efforts were appreciated. This resulted in the formation of meaningful friendships.

Attendance was also found to improve. This finding is also in line with findings internationally. Mathematical confidence and self-esteem also improved.