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Cooperative Learning in the Thinking Classroom: Research and Theoretical Perspectives

Introduction

Cooperative learning is organised and managed groupwork in which students work *cooperatively* in small groups to achieve academic as well as affective and social goals. In hundreds of studies, cooperative learning has been associated with gains in such variables as achievement, interpersonal skills, and attitudes toward school, self, and others (for reviews, see (Cohen, 1994; Johnson & Johnson, 1989; Sharan, 1980, Slavin, 1990). Beyond these overall gains, research also suggests that cooperative learning may lead to gains in thinking skills (Johnson & Johnson, 1990; Qin, Johnson, & Johnson, 1995). Therefore, as a classroom organisation and instructional method, cooperative learning merits serious consideration for use in thinking classrooms. Indeed, several thinking skills programmes, such as Dimensions of learning (Marzano, 1992), recommend that their programmes be implemented with the use of cooperative groups.

In this paper, the following key questions will be examined. What is distinctive about cooperative learning, which makes it different from just groupwork? What has research found about the effectiveness of cooperative learning in promoting thinking? What conditions in cooperative learning help promote thinking? What theoretical perspectives support the "cooperation - thinking" link?

What is different about cooperative learning?

Cooperative learning is more than just groupwork. A key difference between cooperative learning and traditional group work is that in the latter, students are asked to work in groups with no attention paid to group functioning, whereas in cooperative learning, groupwork is carefully prepared, planned, and monitored (Jacobs, 1997; Johnson & Johnson, 1994; Ng & Lee, 1996). Instructional models and structures have been designed, which teachers can adopt and adapt, to help the group work operate more effectively by creating an environment for interactive learning (Abrami et al, 1995).

Several conditions that promote cooperation are seen as criterial elements of cooperative learning (Johnson & Johnson, 1990) - clearly perceived positive interdependence (the feeling among group members that what helps one member helps all and what hurts one hurts all); face-to-face promotive interaction (students need to be interacting with one another, not just members of the same group); individual accountability (each group member feels responsible for their own learning and for helping their groupmates learn); the teaching of collaborative skills; and group processing (groups spending time discussing the dynamics of their interaction and how they can be improved.

A cooperative learning lesson often begins with some direct instruction where the teacher presents new material. This is followed by cooperative groupwork. During the group work, students often take on roles in order to help them feel responsible for participating and learning. The teacher monitors groups to see that they are learning and functioning smoothly. "Team spirit" is stressed with students "learning how to learn" by participation with their peers (Adams & Hamm, 1990; Kagan, 1994).

Teachers who use cooperative learning have learning objectives that are academic, affective, and social. Students are encouraged not to think only of their own learning but of their group members as well. Cooperation becomes "a theme", not just a teaching technique (Jacobs, 1997). Further, cooperation features throughout the school, e.g., teachers cooperate with one another and let their students know about this collaboration.

Communication is structured very differently in cooperative learning classes. Because students learn in collaboration, they consequently engage in extensive verbal negotiations with their peers. The cooperative group provides a more intimate setting that permits such direct and unmediated communication (Shachar & Sharan, 1994). Such a context, proponents of cooperative learning believe, is key to students engaging in real discussion and wrestling with ideas. In this context then, students will be given opportunities to stretch and extend their thinking.

What is thinking?

There are such a variety of definitions of thinking that any attempt to define it will be incomplete. We shall in this section articulate only the thinking skills and strategies that are pertinent to the discussion that will follow.

Thinking, according to Costa (1996), is seen not only in the number of answers students already know but also in their knowing what to do when they *don't* know". In his view, intelligent behaviour is in the manner of the individuals' responses to questions and problems to which they do not immediately know the answer. Teachers concerned with promoting thinking should therefore try to observe how students *produce* knowledge rather than how they merely *reproduce* knowledge. Here, the criterion for thinking is knowing how to act on information which one already has.

Presseisen (1985) distinguishes between thinking skills and thinking strategies. In her model of thinking skills, which draws from Bloom's taxonomy of instructional objectives and Guildford's Structure of Intellect model, she defines five categories of thinking skills and processes as shown in Figure 1:

Figure 1 - Presseisen's Model of Thinking Skills: Basic Processes

CAUSATION - establishing cause and effect, assessment
- Predictions
- Inferences
- Judgements
- Evaluations

TRANSFORMATIONS - relating known to unknown characteristics, creating meanings:
- Analogies
- Metaphors
- Logical induction

RELATIONSHIPS - detecting regular operations
- Parts and wholes, patterns
- Analysis and Synthesis
- Sequences and order
- Logical deductions

CLASSIFICATION - determining common qualities
- Similarities and differences
- Grouping and sorting, comparisons
- Either/or distinctions

QUALIFICATIONS - finding unique characteristics
- Units of basic identity
- Definitions, facts
- Problem/task recognition

The five categories suggested in the Presseisen's framework are essential thinking skills. On the basis of these essential thinking skills, more complex thinking processes (i.e., thinking strategies) are developed. Cohen (1971) identified four key thinking strategies:

- Problem Solving - using basic thinking processes to solve a known or defined difficulty

- Decision Making - using basic thinking processes to choose a best response among several options

- Critical Thinking - using basic thinking processes to analyse arguments and generate insights into particular meanings and interpretations

- Creative Thinking - using basic thinking processes to develop or invent novel, aesthetic, constructive ideas, or products, related to precepts as well as concepts, and stressing the intuitive aspects of thinking as much as the rational.

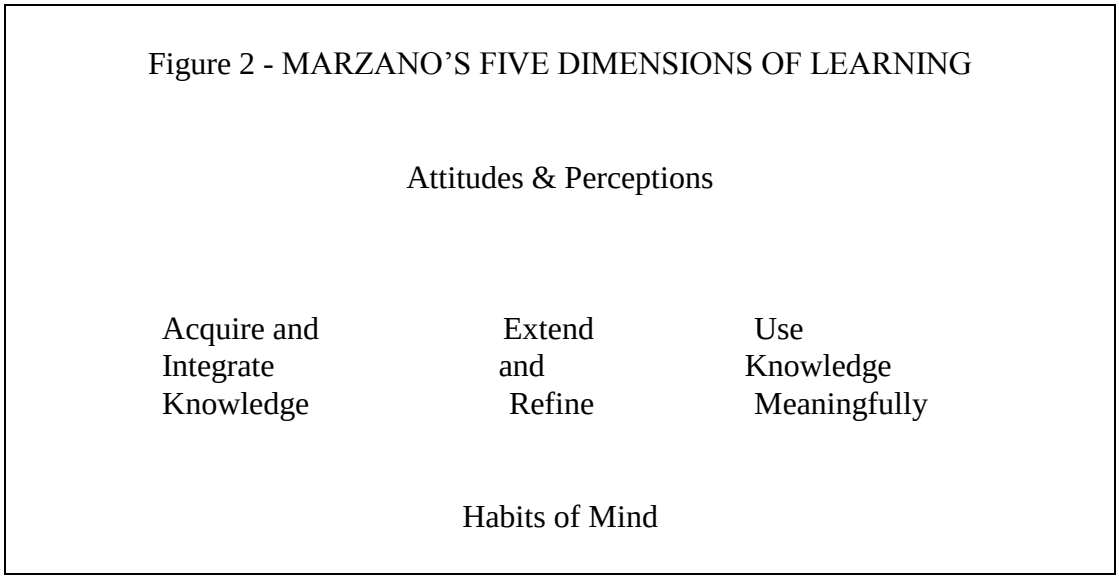
In addition, there are different levels of thought that the human mind may operate at. These levels are:

- Cognition - the skills associated with essential and complex processes
- Metacognition - the skills associated with the learner's awareness of his or her own thinking
- Epistemic Cognition - the skills associated with understanding the limits of knowing, as in particular subject matter, and the nature of problems the thinkers can address.

Marzano's (1992) work concerns the basic types of thinking that occur during effective learning. His model of instruction is based upon the interaction of five dimensions of learning:

1. attitudes and perceptions that create a positive classroom climate
2. acquiring and integrating knowledge
3. extending and refining knowledge
4. making meaningful use of knowledge
5. developing favourable habits of mind

Figure 2 - MARZANO'S FIVE DIMENSIONS OF LEARNING



Source : RJ Marzano. The Many Faces of Cooperation Across the Dimensions of Learning. In N Davidson & T Worsham (1992) Enhancing Thinking through Cooperative Learning, p 7

The types of tasks that help knowledge develop can be divided into two broad categories: those that help "extend and refine knowledge and those that "use knowledge in meaningful ways". Marzano has listed the following set of tasks, which are particularly applicable to knowledge extension and refinement within the subject content.

- Comparing: Identifying and articulating similarities and differences between bodies of information relative to their specific attributes

- Classifying: Grouping items into definable categories on the basis of their attributes

- Inducing: Inferring unknown generalisations or principles from observation or analysis

- Deducing: Inferring unknown consequences and necessary conditions from given principles and generalisations

- Analysing errors: Identifying and articulating errors in one's own thinking or in that of others

- Constructing support: Constructing a system of support or proof for an assertion

- Abstracting: Identifying and articulating the underlying theme or general pattern of information

- Analysing value: Identifying and articulating the underlying theme or general pattern of information

Tasks that involve the meaningful use of knowledge include:

- Decision making: Selecting among equally appealing alternatives

- Investigation: Developing an explanation for some past event or a scenario for some future event and then supporting the explanation or scenario

- Problem Solving: Developing, testing and evaluating a method or product for overcoming an obstacle or a constraint

- Scientific Inquiry: Generating, testing, and evaluating the effectiveness of hypotheses generated to explain a physical or psychological phenomena and then using those hypotheses to predict future events.

- Invention: Developing a unique product or process that fulfils some articulated need.

In some ways, Marzano's dimension 3 corresponds to Presseisen's model of basic thinking processes, and dimension 4 corresponds to the complex thinking strategies suggested by Cohen.

Although not explicit in the model, communication is central to using the dimensions of learning. Three forms of communication are important - writing, speaking, and symbolism. Communication is of particular significance in dimension 4 - making meaningful use of knowledge. When such tasks are assigned, students have to

communicate be it orally, in writing or symbolically using a graphic organiser. Marzano (1992) suggests that tasks such as inquiry, problem-solving and decision-making are probably done more efficiently by cooperative groups than individuals as these tasks are usually taxing in terms of the knowledge and ability which an individual may have.

The following section provides a review of the research that examined the effectiveness of cooperative learning in promoting thinking. The tasks used in the research are highlighted so that the kinds of thinking expected can be placed within the various definitions of thinking skills and strategies.

Research on cooperative learning and thinking

Most of the studies we reviewed found cooperative learning to be more effective than other modes of instruction on higher level tasks. In the studies where cooperative learning did not clearly improve quality thinking, it nonetheless led to gains in other areas, which are often associated with cooperation. Tables 1 and 2 summarise the findings of the studies we reviewed.

Table 1: Studies that found cooperative learning to be "more effective" in promoting thinking.

Study	Treatments	Nature of Thinking Tasks	Findings/Explanations
Johnson, Skon, Johnson (1980) n = 45 1st grade	Cooperative vs. Competitive vs. Individualistic goal structures	Categorisation and retrieval task Spatial reasoning task (Rasmussen Triangle) Verbal problem solving task - math story problems	Cooperative structure led to higher achievement than individualistic on all 3 tasks. In two of the three tasks, the cooperative structure produced higher achievement than the competitive. Why? Students in cooperative groups used superior strategies and perceived more peer support and encouragement for learning
Johnson, Johnson, Stanne & Garibaldi (1990) n = 49 High School Humanities	CL with no processing; CL with teacher-led processing; CL with teacher & student-led processing vs. Individual learning	Complex computer-assisted problem solving task	Students in all three cooperative conditions performed better than in the individual learning condition. Cooperation with teacher- and student processing led to greater problem solving success. Why? Metacognitive processing improves ability to problem-solve through increased student self-efficacy and insights on effective behaviour; feedback increases the frequency of skilful behaviour.

Lazarowitz and Karsenty (1994) n = 708 10th grade Biology	Peer tutoring and small investigative groups (PTSIG) vs. Classroom-lab mode of instruction (CLMI)	Process-inquiry skills (BTSP): measurement, classification, graph communication, interpreting data, prediction, evaluating hypotheses, controlling variables, selecting useful data, designing an experiment	Experimental group achieved significantly higher scores in four sub-scales - measurement, graph communication, interpreting data, designing an experiment, and total test scores. Why? Skills are enhanced by exchange of ideas and cooperative discussion.
Sharan et al (1984) n = 450 junior high	Group investigation vs. STAD vs. Whole class instruction	Higher order test items (Bloom's taxonomy) Literature	Pupils from the GI classes scored the highest on the higher-order items
Sharan, Ackerman & Hertz-Lazarowitz (1979) n = 217 2nd to 6th grade	Group investigation	Low and high levels of cognitive functioning as measured by MCQ achievement test	No difference in achievement on the lower-level questions; superior achievement on higher order thinking
Skon, Johnson, Johnson (1981) n = 86 1st grade	Cooperative vs. Competitive vs. Individualistic goal structures	Categorisation and retrieval task; paraphrasing and explanation task; Math story problems	Higher achievement for cooperative groups. Why? Higher quality of discussion and interpersonal exchange within cooperative learning groups. (Effect Size = 0.41)*

* effect sizes cited in Qin, Johnson, and Johnson (1995)

Table 2: Studies that found cooperative learning to be "no more effective" in promoting thinking

Study	Treatments	Nature of Thinking Tasks	Findings/Explanations
Kneip & Grossman (1979) N = 96	Use of higher order teacher questioning in cooperative(Co) vs. Competitive(Cm) goal structures vs. Control (C)	40 lower-order and 40 higher-order questions	Lower-order subtest - Cm and Co did significantly better than C. There was no difference between Cm and Co Higher-order subtest - Cm and Co did better than C. Cm did better than C. Why? Lack of training in working in cooperative groups and individualistic reward structure that motivates children to engage in competitive behaviour (Effect Size = -0.11)*
Ross (1988) Study 1 n=342, 4th grade Study 2 n=259, 4th grade	STAD vs. Whole-class vs. Control with no explicit teaching of problem solving skills	Socio-environmental studies problem solving test: comparative problems, decision-making problems	Cooperative and whole class teaching outperformed the control; cooperative treatment did not produce better problem solving skills than whole class. Why? STAD independent practice was not sufficient for mastery (time was constant in all treatments); loafers left difficult part of the task to others; most competent group member not able to tutor effectively; lack of helping behaviours. Effect Size (Study 1) = 0.80* Effect Size (Study 2) = 0.49*
Georgas, J. (1986) N = 90 7th grade	Cooperative vs. Competitive vs. Individualistic	Problem-solving - Mastermind and questions	No difference in problem solving effectiveness of the three groups. Why? Stress dominated because of a demanding level of performance expected. Effect Size: -0.22*
Lazarowitz, Hertz-Lazarowitz & Baird 1994) n = 120 11-12 grade	Group mastery learning (Jigsaw) vs. Individualised mastery learning	Creative essay Earth Science	No significant differences in number of ideas and essay scores between the two groups.

* effect sizes cited in Qin, Johnson, & Johnson (1995).

Qin, Johnson & Johnson (1995) report on a review of forty-six research studies published between 1929 to 1993. Sixty-three relevant findings from the studies were subjected to meta-analysis. The number of times cooperation outperformed competition was fifty-five, and only eight had competition outperforming cooperation. Cooperative learning was superior in solving linguistic problems (effect size = 0.37), non-linguistic problems (effect size = 0.72), well-defined problems (effect size = 0.52) and ill-defined problems (effect size = 0.6). Linguistic problems are "primarily represented and solved in written or oral languages" whereas non-linguistic problems are "primarily represented and solved in pictures, graphs, mathematical formulae, symbols, motor activities, materials or actions in real situations". Well-defined problems have a "clearly specified goal and representation" whereas ill-defined problems are "those for which there is uncertainty concerning the operational procedures and the goals of the problem" (p.130). There are several possible explanations for the conflicting findings: (i) definitions of problem solving may have differed; (ii) different types of problems were used; (iii) different aspects of cooperation and competition were assessed; (iv) age differences of the subjects, ranging from children to adults; (v) variations in methodology and rigour of the studies.

Rolheiser-Bennett (1986) examined cooperative learning as an example of a social model of teaching. One of the student achievement outcomes looked at was higher and lower order thinking. Cooperative learning groups outperformed other instructional modes for both types of thinking. Five studies resulted in 14 effect sizes and an overall effect size for the lower thinking category of 1.05. For the higher-order thinking category, three studies produced seven effect sizes. The overall effect size for the higher-order thinking category was 1.29. In practical terms, an effect size of 1.00 on a particular outcome measure meant that the average student moved up 34 percentile points or 1 standard deviation by being in an experimental group that experienced cooperative learning. A negative effect size would have indicated that being in the cooperative learning group, rather than in the control group, had caused the average student to perform more poorly on the outcome measure.

Thus, there is some evidence of the efficacy of cooperative learning in promoting thinking and problem-solving. It is probable that only certain cooperative learning techniques are suited to the attainment of higher cognitive outcomes. This issue certainly needs further research. Cooperative learning methods such as cooperative controversy (Johnson & Johnson, 1992), co-cognition (Costa & O'Leary, 1992), and group investigation (Sharan & Sharan, 1992) may be some examples of techniques that are more likely to encourage thinking.

Why does cooperative learning promote thinking? Theoretical Perspectives

A number of theoretical perspectives underlie work in cooperative learning. Table 3 presents several of these perspectives. The table also includes names of key theorists, a brief explanation of the how the perspectives tie cooperative learning and thinking, and one or more examples of cooperative learning techniques that flow from the perspective. After the table, the perspectives are explored in slightly greater depth.

Table 3. Theoretical perspectives on how cooperative learning can promote thinking and cooperative learning techniques that arise from them

Theoretical Perspective	Theorists	Explanation	CL Technique
Social psychology	Allport Deutsch Johnson & Johnson Lewin	Group dynamics, e.g., positive interdependence and individual accountability, create the conditions for groups to think together	Jigsaw
Developmental psychology	Piaget Vygotsky	Differing views foster cognitive development by causing disequilibrium; Thinking that students can do today only with peer scaffolding, they can do tomorrow alone	Cooperative controversy; pairs check
Cognitive psychology	Bruner Craik & Lockhart Wittrock	Greater depth of processing and deeper thinking via explaining to others	MURDER
Motivation theory	Bandura Skinner Slavin	Peers provide positive reinforcement for and models of thinking	STAD
Multiple Intelligences theory	Gardner	Opportunities to apply interpersonal intelligence to tasks aids thinking and develops the ability to think collaboratively	Talking chips
Humanistic psychology	Dewey Rogers	Taking initiative encourages students to think about what is important to them	Group investigation
Global education; Moral values education	Kohlberg Reardon	Students need to learn the skills and develop the inclination cooperate with other people and with nature to promote the welfare of all..	Corners

Social psychology

Field theory in social psychology (Lewin, 1935; 1948) takes from physics the notion of attraction and repulsion in magnetic fields and applies it to group dynamics. In this view, three types of relations can exist between group members (Deutsch, 1949; 1962) :

1. Positive interdependence - what helps one group member is perceived as helping all, and what hurts one group member is seen as hurting all. Positive interdependence encourages cooperation.

2. Negative interdependence - what helps one group member is seen as hurting others and what hurts one is viewed as helping the others. Negative interdependence encourages competition.

3. No interdependence - what happens to one group member is not perceived as affecting the others. No interdependence encourages an individualistic attitude.

Johnson and Johnson (1994) have developed many means of encouraging positive interdependence. They also emphasise the importance of individual accountability and of students being in heterogeneous groups, based on such criteria as past achievement, sex, ethnicity, nationality, and social class.

Allport's (1954) work in social psychology provides other intersecting ideas toward this goal. His investigations of how best to help people from different racial groups come to live together more harmoniously led him to derive three conditions which seem essential for interaction to result in greater harmony and more productive relations. These are:

1. The interaction must be of equal status
2. They must have common goals
3. Their collaboration should be officially sanctioned.

These three conditions are applied to the classroom by Aronson, et al. (1978), who worked to improve racial relations among students in the schools of a U.S. city. As a result, the well-known cooperative learning technique, Jigsaw, was developed. With Jigsaw, students begin the activity in their home team, membership in which is chosen by the teacher in order to create heterogeneous groups. Each member then leaves the home team to form an expert team with members of other home teams. The expert team's job is to learn, create or discover concepts and information, which they will later teach to the members of their home team. The home team then does a task that draws on the work of all the expert teams. Thus, following Allport's three criteria, each member of the group has unique information (helping to promote equal status) that they must share with groupmates in order for the group to achieve its goal (common goal) and this collaboration, of course, is taking place with the teacher's sanction. Further, the use of heterogeneous groups improves the chances that students will encounter a range of perspectives, thus, hopefully improving their perspective-taking ability.

Jigsaw encourages positive interdependence and individual accountability because each member has different resources, which they must contribute to the group in order for it to successfully complete the task at the end of the activity. Social psychologists believe that by paying attention to these group dynamics factors, educators create an environment in which students feel support from peers, an environment in which they can take risks. Such an environment is essential for thinking.

Developmental psychology

Theorists working from a cognitive developmental perspective have long emphasised the role of interaction, e.g., Piaget (1980) and Vygotsky (1978), who place importance on social interaction as a force in mental development. For Piaget, the differing points of view that emerge as people discuss a collaborative task pushes cognitive development by causing disequilibrium, which leads learners to rethink their ideas. An example of a cooperative learning technique that seeks to create this type of cognitive conflict is cooperative controversy (Johnson & Johnson, 1994).

Cooperative controversy employs the following procedure:

Step 1 Students learn about topic.

Step 2 Students form groups of four that divide into pairs. One pair is assigned to be pro; the other pair is assigned con. They prepare to present their opinion.

Step 3 Pairs present their assigned opinion with each member taking part. The other pair take notes.

Step 4 Debate back and forth, holding to the pairs' assigned positions.

Step 5 Pairs change assigned positions and prepare to present their new position.

Steps 6 and 7 Repeat Steps 3 and 4 with new positions.

Step 8 Students attempt to achieve consensus, with each representing their own view.

For Vygotsky, all learning is social, as is the cognitive development that results from learning. What students can do today only with peer support they can do tomorrow on their own, as a result of having enjoyed that support previously. An analogy is made to the scaffolding (Applebee & Langer, 1983) used to support a building that is under construction. As the building nears completion, the scaffolding is gradually withdrawn. This concept applies to thinking skills as well as other types of learning. Many cooperative group activities have emerged from this perspective on human development, e.g., peer tutoring (Palinscar, Brown, & Martin, 1987).

A cooperative learning technique that promotes scaffolding is pair check (Kagan, 1994). Students work in groups of four, divided into two pairs. The procedure is as follows:

1. One member of each pair thinks aloud while writing solutions to a problem. The other member observes.

2. The observer gives feedback, and the pair attempts to agree on solutions to the problem.

3. Pair members reverse roles for the next problem, repeating steps 1 and 2.

4. After every second problem, the two pairs compare their solutions.

Cognitive psychology

Theorists in the cognitive psychology tradition, e.g., Wittrock (1974) and Craik and Lockhart (1972), have also been looked to in validating the use of cooperative learning. Wittrock emphasises the value of verbal production as students repeat and restructure information and ideas in order to make them their own and then communicate them in oral or written form to others. Craik and Lockhart developed the "depth of processing" concept, i.e., that what receives deeper thought is more likely to be understood and remembered.

A number of cooperative learning techniques have been developed by scholars in the cognitive psychology tradition, e.g., the dyadic MURDER script (Hythecker, Dansereau, and Rocklin, 1988), that asks students to collaborate to perform the thinking tasks or summarising and elaborating on reading material. The procedure for MURDER is as follows:

Mood	Create a relaxed mood, set your procedures (both members)
Understand	Understand the section by reading silently (both members)
Recall	Summarise the main ideas (one member)
Detect	Listen for errors or omission in the summary (one member)
Elaborate	Elaborate on the ideas in the section with examples, connections, opinions, reactions, applications, questions (both members)
Review	Summarise the entire passage after completing all the sections (both members)

Motivation theory

Another major view in psychology is represented by motivational theorists, such as Skinner (1968) and Bandura (1965). They highlight the importance of the consequences of students' actions for whether or not the actions are learned. In a teacher-fronted classroom, reinforcement for positive learning behaviours usually comes only from the teacher. Indeed, in the typical teacher-fronted classroom, students often feel negatively interdependent with one another, competing against each other for reinforcement from the teacher in such forms as praise and grades. In contrast, when learners feel positively interdependent toward their peers, they become an alternative source of positive reinforcement for learning. This reinforcement encourages students to

work hard to succeed and help their groupmates succeed at learning tasks, and the use of thinking skills facilitates success in almost any task.

Slavin (1990) and his colleagues have done a great deal of work on cooperative learning from this tradition, developing techniques such as student teams achievement divisions (STAD). In STAD, the teacher first presents material before asking heterogeneous teams of learners to study together in preparation for a quiz. Each student contributes to team rewards (e.g., certificates) based on a comparison of this quiz score and their average on past quizzes, but grades are based solely on individual scores.

Multiple intelligences theory

Howard Gardner's multiple intelligences theory (1983) has helped broaden educators' views on what constitutes intelligence and how to help students to develop their intelligence. One type of intelligence that has been highlighted is interpersonal intelligence. Such intelligence is vital in cooperative learning, and working in cooperative groups provides students with opportunities to deploy and develop this intelligence. For instance, students in a mathematics class who are relatively low in logical-mathematical intelligence but relatively high in interpersonal intelligence can make an important contribution to their groups by deploying their interpersonal intelligence to help the group function effectively.

Many cooperative learning techniques focus on group functioning. One of these is talking chips (Kagan, 1994), which is designed to encourage all group members to speak and to develop students awareness of the issue of equal participation. In talking chips, each group member starts with three chips. Each time they speak, they must give up one chip. When they have no more chips, they cannot speak again - except to ask questions - until everyone has used all their chips.

Humanistic psychology

A school of psychology often seen as on the other end of the spectrum from the motivational theory is humanistic psychology (Dewey, 1966; Rogers, 1979). Humanists are known for valuing affective goals in addition to cognitive ones, and for seeing students as capable people who should have the freedom to take initiative and to develop learning objectives that they see as relevant to their own needs and interests. Cooperative learning fits particularly well with this perspective, as it provides students an alternative to the teacher-fronted classroom.

For example, group investigation (Sharan & Sharan, 1992) has student groups choose their own topics and decide how to research them in preparation for sharing what they learn with the entire class. The procedure is as follows:

1. Teacher introduces a challenging, many-sided problem. Alternatively, the class can help to formulate the problem.

2. The class organises itself into groups with each investigating a different aspect of the problem.

3. Each group plans the *what* and the *how* of its investigation

4. The groups implement their plans.

5. Groups do presentations to the rest of the class based on their work.

6. The teacher, class and groups evaluate the work of each group and group member.

Global education and Moral values education

Related to humanistic psychology is scholarship related to learners' role as citizens of the world and to learners' moral values. Global education (Reardon, 1988) encourages students to learn about, show concern for, and participate in matters concerning peace, development, and the environment, both locally and globally. Moral reasoning plays a key role in people's values regarding such issues. Kohlberg (1963) and Levine, Kohlberg, and Hewer (1985) studied the development of moral reasoning. They saw the highest stage of thinking about moral issues as one in which people develop their own principles based on justice, equality, and human rights. Examining and formulating one's own values regarding issues taken up by global education and deciding on plans of action relative to them requires a great deal of moral reasoning and other complex thought.

Many cooperative learning activities lend themselves to the discussion of moral values and global issues. For instance, Corners (Kagan, Robertson, & Kagan, 1995) encourages students to think about various issues using the following procedure:

1. The teacher or students propose an issue on which people may take a number of positions. One corner of the room is designated for each position on the issue.

2. Without discussing with others, students decide which position fits their current thinking on the issue. They then write their choice and the reasons for it on a piece of paper.

3. Students go to the corner they choose and form pairs with other people in the same corner to discuss their position and the thinking, including values, behind it.

4. Students leave their corners and form pairs with people from other corners to discuss the issue. Of course, students are allowed to change their positions and to adopt positions different from those in any of the corners.

Corners can be followed by students discussing what actions they will take based on their choices and then report back at a later date on what they have done in the intervening time.

Conclusion

In this paper, we have looked from theoretical, research and practical perspectives at what cooperative learning is and how it might play a role in creating thinking classrooms. Some of the key concept we have reviewed are summarised in Figure 3.

We believe, based on the ideas and information in the paper, as well as our own experience as teachers and learners, that cooperative learning can support an environment in which students feel encouraged to take part in higher order thinking. However, more work needs to be done on how to best to build the cooperative learning - thinking link. We will be honoured if you deem it worthy of your effort to communicate with us on how best to strengthen this vital link in the education chain.

(Insert Figure 3)

END

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Figure 1 - Presseisen's Model of Thinking Skills: Basic Processes

CAUSATION - establishing cause and effect, assessment
- Predictions
- Inferences
- Judgements
- Evaluations

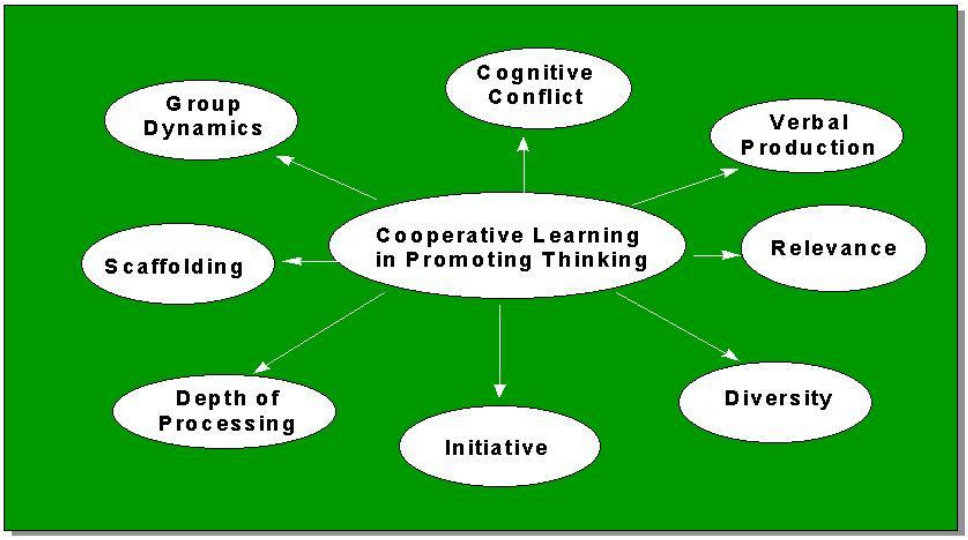
TRANSFORMATIONS - relating known to unknown characteristics, creating meanings:
- Analogies
- Metaphors
- Logical induction

RELATIONSHIPS - detecting regular operations
- Parts and wholes, patterns
- Analysis and Synthesis
- Sequences and order
- Logical deductions

CLASSIFICATION - determining common qualities
- Similarities and differences
- Grouping and sorting, comparisons
- Either/or distinctions

QUALIFICATIONS - finding unique characteristics
- Units of basic identity
- Definitions, facts
- Problem/task recognition

Figure 3. Key concepts linking cooperative learning and thinking



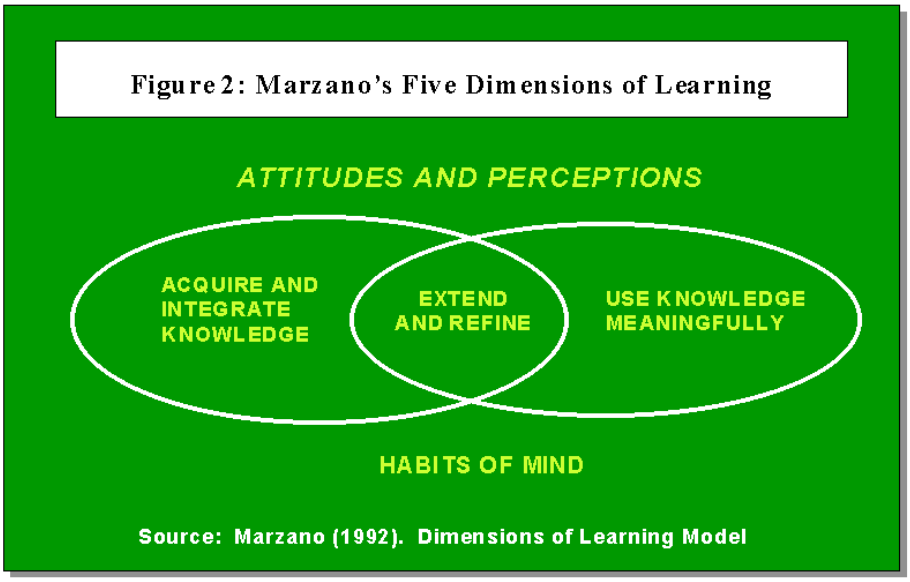


Figure 2: Marzano's Five Dimensions of Learning
ATTITUDES AND PERCEPTIONS
ACQUIRE AND INTEGRATE KNOWLEDGE
EXTEND AND REFINE
USE KNOWLEDGE MEANINGFULLY
HABITS OF MIND
Source: Marzano (1992). Dimensions of Learning Model