

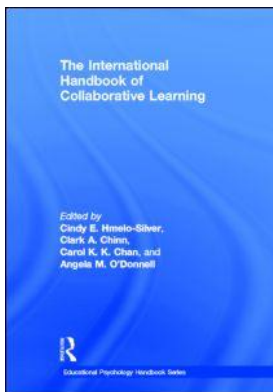
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20

THE GROUP INVESTIGATION APPROACH TO COOPERATIVE LEARNING

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Group Investigation is a ... self-consistent educational method ... concerned with getting the student to have planned experiences, reflect on them, and extend their meaning and usefulness through knowledge obtained from the experiences of other people. (Thelen, 1981, p. 5)

INTRODUCTION

Cooperative learning is a generic approach to teaching that has spawned a variety of methods to facilitate learning together in small groups so that everyone can participate in and contribute to attaining the group's goal. As students and teachers gain confidence in the practice of cooperative learning (CL), teachers introduce methods which call for increasingly diverse and complex learning skills and interaction among learners. One of these methods is Group Investigation (GI), where the content of the inquiry is determined in varying degrees by the diversity of students' interests, experiences, and knowledge (S. Sharan & Hertz-Lazarowitz, 1980; Y. Sharan & S. Sharan, 1992, 1999; Thelen, 1960, 1981).

Group Investigation is a cooperative learning method that integrates interaction and communication among learners with the process of academic inquiry. As learners take an active part in their inquiry in the course of a GI project, the classroom becomes a social system built on cooperation in learning within groups and on coordination of learning among groups. At first small groups of learners plan what they will study and

how they will study. As the investigation progresses they divide the responsibilities for various aspects of the investigation, combining individual, pair, and group learning. When they complete their inquiry, group members integrate and summarize their findings and plan how to present them to their classmates. Throughout the process, teachers guide their students in the required social and learning skills.

Group Investigation is applicable in any content area, whenever a multifaceted problem is identified that has more than one answer or sources for its resolution. GI is also aimed at students of all ages, in all grades, including college and university classrooms.

Research on cooperative learning (CL) made its major debut in the relevant literature about 35 years ago when CL reemerged as a systematic pedagogy. Like most other concepts and methods in education, cooperative learning can be traced to ancient and modern thinkers and educators, as is described in the historical review by Hertz-Lazarowitz and Zelniker (1995). CL practice is consistently supported by research, with ongoing examination of the effectiveness of CL and constant revision and refinement of theory and cooperative procedures (Johnson & Johnson, 2009; S. Sharan, 1990; Slavin, 2010). An analysis of the literature on GI by Mitchell, Montgomery, Holder, and Stuart (2008) presents evidence of renewed interest in making the effects of GI known to a contemporary generation of teachers and researchers.

In this chapter we discuss the theoretical background of GI, present the steps of implementation, and review research from several decades of GI related studies.

GROUP INVESTIGATION'S DEBT TO JOHN DEWEY (1859–1952), HERBERT THELEN (1913–2008), AND KURT LEWIN (1890–1947)

Dewey, Thelen, and Lewin provided both the theoretical and practical foundations of Group Investigation; Dewey as early as the last decade of the 19th century (Archambault, 1964; Childs, 1951; Kilpatrick, 1951; Miel, 1952; Thelen, 1954). Dewey's and Thelen's seminal roles were discussed in earlier publications (S. Sharan, 1980; Y. Sharan, & S. Sharan, 1992). All developers of CL methods acknowledge their debt to the development and understanding of group dynamics by Kurt Lewin (1947a). After all, humans have interacted in small groups since time immemorial, and the dynamics of interaction in small groups have been recognized throughout history (Hare, 1962/1976; Hertz-Lazarowitz & Zelniker, 1995). Developers of methods other than GI trace their roots to various theories, such as social interdependence theory (Johnson & Johnson, 1975/1994), or to a neobehaviorist orientation and a motivational perspective, where some competition and the accumulation of rewards are incorporated (Slavin, 1983, 1995, 2010). Yet given that CL methods always include some form or degree of group interaction, lessons taught by the school of group dynamics are applicable to all forms of cooperative learning, whatever their primary theoretical orientation.

Dewey emphasized the social nature of schools, and also tried to influence schools to embody the principles of democracy. Dewey established what he called a Laboratory School at the University of Chicago in 1896 (Kilpatrick, 1951). First and foremost that meant, for Dewey, that students express their preferences in terms of what to learn and how they should proceed with their work or activities in school. The citizens in a democracy have the right to express their will to the authorities in power. He asserted that students' interest in their studies would be stimulated when given the opportunity to bear responsibility for directing their work in school. Self-direction is one of the prime

motivators of human behavior. People are more motivated to carry out what *they* decide to do rather than when they are told what to do by others. A high level of motivation to learn is also accompanied by intellectual and emotional involvement in the content of what is being studied (Dewey, 1899/1943).

The title of Dewey's 1899 publication, *The School and Society*, suggests that he recognized the importance of the social and societal dimensions of education, no less than the cognitive-intellectual ones. Through its social character the school manifests its participation in life itself, rather than being a preparation for life. If schools are set apart from society they appear to be disconnected from the structure and values of society at large, as if the school was concentrated almost exclusively on the transmission of information. "A spirit of free communication, of interchange of ideas ... becomes the dominating note ... school life (thereby) organizes itself on a social basis ..." (Dewey, 1899 cited in Archambault, 1964, pp. 301–302). To this very day, communication in most schools is carefully monitored and not "free" as Dewey wished, although, try as they may, schools consistently fail in their attempt to regulate communication among students during classroom sessions. As explained in greater detail later in this chapter, CL in general, and GI in particular, are based upon and seek to encourage communication among students as well as between students and teachers, as an essential instrument of learning.

The practical link between Dewey's and Lewin's theories and their application to classrooms was forged by Herbert Thelen, who developed Group Investigation as a systematic inquiry strategy for students learning together in small groups. Thelen's design combines the view of learning as the conduct of inquiry by cooperative small groups with the principles of effective group management, so that groups can successfully solve problems and make decisions based on all group members' contributions and views (Y. Sharan & S. Sharan, 1992; Thelen, 1960, 1981). GI is also compatible with Piaget's constructivist cognitive psychology that asserts that individuals actively build their notions of reality out of their own experiences. Learning *about* a subject is inadequate without providing the learner with an opportunity to actively experience how knowledge is generated. GI enables learners to seek information in cooperation with their peers, and together shape their information and ideas into meaningful constructs.

Why an Inquiry Approach to Learning?

The systematic application of an investigative approach to learning is one of the cardinal ways by which humanity has expanded its knowledge and understanding of itself, the world and the universe. Therefore it comes as no surprise that throughout the years educators in various countries and contexts have designed inquiry-based approaches to learning that go by different names (or even without a name), supported by experimental or action research, or sometimes by teachers' reports. For example, in England in the 1970s an "Environmental Studies Project" (Harris & Evans, 1972) invited students in the elementary grades to plan and carry out the investigation of phenomena in their surroundings that piqued their interest. Some 20 years later Peter Forrestal (1990) taught his English literature students in Australia to pose questions for inquiry and conduct a subsequent investigation. These two projects were not studied in the rigorous way expected today, but their descriptions serve as edifying examples of inquiry-based learning.

Today school systems in different countries have adopted problem solving approaches to learning that require team work; even businesses and industries have realized the benefit of such an approach to attaining their goals. Each variation on the process of

engaging learners in the active pursuit and construction of knowledge may emphasize a different aspect of the investigative process. Detailed research into one inquiry model known as problem-based learning conducted by Hmelo-Silver and Barrows (2006, 2008) centers on components such as scaffolding, framing goals and strategies, the teacher's and facilitator's role, and the role of technology. Problem-based learning shares the general orientation toward learning by investigation, whereby students seek the ideas or information they need to solve a problem or answer questions that they themselves pose at the onset of a PBL project.

Authentic implementation of inquiry-based learning advances students' understanding of their lives in society and of the connection between their community and the world. With teachers providing direction, helping to clarify group problems, and providing access to resources both in and out of school, student groups will be able to pursue cooperative investigations with greater efficacy. This approach focuses on the group's cooperative planning of its investigation, setting its goals, delegating different tasks or roles to group members who to some degree must coordinate with their colleagues the manner and pace of their work. Advance group planning of goals, distribution of tasks and roles, and plans for continued coordination are early steps in the formation of an investigative group.

A unique feature of an investigation is that neither the teacher nor the students know at the outset the entire scope of knowledge they will gain in the process of investigating, organizing, and presenting their findings. The major part of the teacher's role is to serve as a resource person, not to serve as the primary font of prescribed knowledge. The point is not that the group members "discover" the basic idea or solution to the questions they posed (Shulman & Keislar, 1966) but that they build up knowledge from the information they are able to find in the sources available to them.

A major challenge to teachers who guide the investigation is the development of a classroom climate in which students have the confidence to ask questions about what they would like to know and understand about a topic. To do so, teachers should facilitate and guide their students in the development of all the interactive skills discussed below. In addition they alter the traditional nature of questions they ask, to which they know the answers, by posing questions that do not have one right or wrong answer, but generate a wide range of acceptable answers. These produce fewer predictable responses and enable students to include what they already know in their answers (Forrestal, 1990). Conditions that affect students' ability to ask questions and their ability to exercise other thinking and problem-solving skills have been studied by Gillies and associates (Gillies, 2000, 2002; Gillies & Asaduzzaman, 2009). Their findings emphasize the centrality of the teacher's role in structuring learning in cooperative groups so that students gain the maximum benefits from working together. This is further highlighted in the Gillies and Boyle study (2008) that illustrates the importance of training teachers in the types of mediated learning behaviors that challenge students' thinking and promote higher order thinking and reasoning so that they can model it in the classroom and then guide students in their application.

How Is Interaction Essential to Group Investigation?

GI takes place in a classroom organized as an inquiring community, which provides the social context for the process. At each stage of GI there are ample opportunities for interaction. In pairs and in small groups, learners discuss what they will investigate,

how they will go about it, how they interpret their findings, and how they will present them to the class. Throughout the investigation learners share ideas and resources and provide mutual help and support

The cultivation and development of positive group norms that sustain constructive interaction and group productivity, with emphasis on mutual assistance among group members, have been discussed for decades in the literature on group dynamics (Hare, 1973; Hertz-Lazarowitz, 1989; Hill, 1969; Lewin, 1947b; Mann, 1967; R. Schmuck & P. Schmuck, 2001; Steiner, 1972; Tuckman, 1965). Groups function relatively well when their members wish to belong to the group and feel accepted by group members. Constructive communication with peers is most often accomplished when they anticipate that group members will listen to them sympathetically, without necessarily agreeing with everything they have to say. The absence of members' expectations for a favorable platform on which to express their ideas will naturally inhibit communication among group members and result in relatively sterile group activity.

Group members may display behaviors intended to enhance their status in the group and their relative influence over other group members. Positive group interaction requires that members relinquish a certain degree of autonomy and grant each other the right to participate in, and influence, the group's work and decisions. They must also recognize the group chairperson's authority in his or her effort to manage how the group conducts discussions and divides the work at each stage of the inquiry.

Before embarking on a GI project teachers find it helpful to demonstrate and practice interaction skills with the class. These skills are intended to make group members aware of *how* they behave as group members, and not concentrate solely on *what* they wish to say. To help teachers set the stage for successful interaction during an investigation, there is a varied and time honored pool of short term activities that develop the social and learning skills needed for successful group discussion and interaction, such as found in Cohen (1994) and in Kagan and Kagan (2009). All the basic cooperative learning skills offered by these sources (and many others) are part and parcel of the ongoing interaction among students in all cooperative learning methods, and especially during a GI project.

Each group in a GI project derives its goal directly from the design of the learning task, which is not related to any extrinsic reward that may trigger intergroup comparisons and competition. In order to allow for groups to base their goal on the learning task, it must be sufficiently complex to permit a variety of subtopics to be identified, or for different points of view to be expressed. Mutual assistance in the group is multi-lateral, and is made possible because everyone has something to contribute that is not studied by other group members. Group members also receive feedback about the extent to which they accepted the equitable distribution of time that allows everyone a chance to express their thoughts (Schmuck & Schmuck, 2001; Y. Sharan & S. Sharan, 1992).

IMPLEMENTING GROUP INVESTIGATION

A GI project is launched when the teacher poses a broad, multifaceted problem such as:

- How Did Explorers Change the World?
- What Makes a Poem a Poem?
- What and How Do Animals Eat?

Students plan which aspects of the problem to investigate and what resources to use. They ask questions about the topic, form groups to seek answers to their questions, and to interpret and integrate information in light of their knowledge, ideas, experiences, and abilities.

There are six stages that follow each other, each of which may require two, three, or more class sessions. The stages of GI, the students' and teacher's role in each stage, and examples of GI projects are presented in great detail in Y. Sharan (1995), and Y. Sharan and S. Sharan (1992, 1999).

Stages of Implementation of Group Investigation

1. Class determines subtopics of the problem and organizes into research groups;
2. Groups plan their investigations;
3. Groups carry out their investigations;
4. Groups plan their presentations;
5. Groups present their findings;
6. Teacher and students evaluate the projects.

Stage 1: Class Determines Subtopics and Organizes into Research Groups

At this stage the class explores possible subtopics for investigation. Each group selects one of the subtopics as the title of its investigation.

At the outset of the process the teacher's role is to:

- a. present the whole class with a broad problem that generates many questions;
- b. stimulate students' interest in investigating the problem.

A broad problem can have global relevance, as in: "Why do we want to explore outer space?" or regional relevance, as in, "How has the river affected our town?" or reflect the changing makeup of the local population, as in "How have recent settlers affected our town?" To begin learning about the scope of such problems and possible questions they generate, students are invited to look over a variety of sources, including films, newspapers, books, and of course to search the Internet. They are also encouraged to interview people who might have knowledge of the topic, visit a relevant site, and so forth. Exposure to diverse sources helps students identify a particular aspect of the subject that arouses their interest. That will help them to formulate specific questions for investigation.

Individually students write their questions, compare their lists in pairs, and finally in groups of four. All questions are presented to the class; the compiled list represents the interests of all students and so becomes the class's "capital—a form of wealth which carries with it a mounting expectation of further interesting investments" (Thelen, 1981, p. 153). The next step is for the class to sort the questions into several categories, which become the subtopics of the investigation. The final step at this stage can be carried out in one of two ways: groups are formed and each group chooses the subtopic it will investigate, or each student chooses a subtopic and groups are formed of students with the same interests.

Stage 2: Groups Plan Their Investigation.

At this stage each group plans its investigation, and each group member decides on which aspect of the group's subtopic he or she will focus. Using the class's list of questions

as a base, group members choose one or two questions that best reflect their interests, and the group recorder notes all members' questions. Plans should include a statement of the steps each group member will take, what he or she will do to collect information, and where the information can be found. The teacher circulates among the groups and offers assistance where needed. As often happens when one looks for information, one source leads to another, so that the list of sources of information identified at this stage may not be final.

It is recommended that, in addition to the research groups, a group consisting of one representative from each small group serves on a "steering committee," which will coordinate all groups' presentations in stage 4.

Stage 3: Groups Carry Out Their Investigations

The number of class sessions at this stage depends on the scope of the investigation, the range of relevant resources, and their accessibility. Plans for collecting information may rely on a wide variety of sources, such as information on the Web, traditional library work, conducting a science experiment or a survey of opinions of people related to the topic, a visit to a museum, interviews with people who can shed light on the topic, and even someone's grandparents' stamp collection.

In a social studies investigation of the effects of migration on the community, students may find that adults in the community are among the more significant resources. An opportunity to visit diverse sites where adults practice their professions or carry out their business impresses students with the meaning of the topic for their lives in their society.

While carrying out their investigation students take notes and record the main ideas of what they read, see, or hear so they can share their findings with their group mates. Periodically in the course of the investigation groups discuss the investigation's meaning as it unfolds and strive to integrate the ideas they read about, the events they see, and the answers they find to the questions they ask. It is not uncommon, as groups become skilled in GI, for these discussions to generate new questions, which then lead to further investigation.

Stage 4: Groups Plan Their Presentations

Presentation of groups' findings to their class acknowledges their results as well as highlighting the contribution of each group's findings to the resolution of the whole-class problem. When presenting their findings students assume a new role, the role of teacher. To teach their classmates well, group members first summarize the answers to their questions, then plan cooperatively how best to convey the major findings of their investigation.

The first step in planning a presentation to an audience is for the group to identify the main ideas of its findings. The second step is to choose a way to present them clearly so that the audience can easily grasp them. Presentations may include a handout of sources and other evidence of the group's findings. There are multiple means for conveying their message, such as: an exhibit, a model, a skit, a quiz, a tour, a video presentation, and so forth. If the investigation included an experiment, groups may weigh the appropriateness of having the whole class conduct the same experiment as evidence of their claims.

Stage 5: Groups Present Their Findings

The class reconvenes for the groups' presentations after the steering committee and the teacher have set up and posted a schedule of presentations. After each presentation the class (the "audience") fills out a short feedback questionnaire. Questions might include: (a) What was the main idea of the presentation? (b) Did all members of the group participate? (c) How did the presentation help you understand the group's findings? Beforehand it is important to establish rules for making comments in a constructive way.

The teacher also fills out a questionnaire, in addition to her or his role as coordinator of the presentations. At the end of each presentation teachers lead a feedback discussion with the entire class. This is the students' opportunity to note how other groups organized and presented their findings, thereby broadening their perspective on the preparation of presentations. In that process, each group can become aware of its role as a resource for other groups who may wish to learn more about their specific area of investigation. When all presentations are completed the teacher leads the class in a discussion of how all of the groups' findings contributed to the resolution of the original class-wide problem, thus demonstrating how at the end of the project the class comes together as a group of groups.

Stage 6: Teacher and Students Evaluate Their Projects

Evaluation of GI focuses on the knowledge acquired in the course of the project, and on the individual and group experience of investigation. Traditional testing of facts is a distinctly limiting form of evaluation and out of character with the entire process of GI. There are several ways to evaluate the outcomes of students' learning in a GI project.

Students' feedback on the learning experience is one example of class-wide assessment (Birenbaum, 2003; Birenbaum & Dochy, 1996; Stiggins, 2000). Teachers and students can also collaborate by preparing a quiz that incorporates questions submitted by the students, based on their findings.

If teachers are constrained to test students so they can be given a grade, the test can consist of two questions submitted by each group. In a class with seven groups, for example, there would be 14 questions in the test. Each student is asked to respond to 12 questions, excluding the 2 submitted by his or her own group. The expectation is that before the test individual students review their own work and that of other groups. Of course teachers may also add 2 questions.

Another way of evaluating learning is to invite students to demonstrate their ability to draw conclusions from their inquiry and to apply their new knowledge to related problems or situations. To this end teachers could invite the class to publish a newspaper that includes all the group summaries, or, when appropriate, draft a bill to present to the mayor calling for changes in zoning policy. For individual evaluations students may be asked to write a letter describing a day in the life of a personage they investigated, or a letter from that person to a colleague or to someone who contested their work, or prepare a series of electronic messages that follow the work of a particular person, and so on. The teacher would stipulate in advance the type of facts and main ideas students are expected to demonstrate in individual and in group summarizing efforts.

The teacher's role in stage 6 is to:

- a. Evaluate students' understanding of the main ideas learned in their investigation;
- b. Evaluate students' knowledge of new facts and terms;
- c. Evaluate how students integrated findings from all of the groups;
- d. Facilitate individual, group, and class-wide reflections on the process and content of the investigation.

Throughout the investigation the teacher has many opportunities to observe students' academic performance, cooperative behaviors, and level of motivation. As they circulate among the groups teachers learn a great deal about how individuals and groups proceed, how well students are acquainted with the subject under study, how they conduct discussions with one another and in their groups, if everyone is participating, if they reveal a sufficiently high level of thinking about the subject matter, and so forth. Teachers can also discuss with individual students what they feel about the content of their investigation, what interests them, or even if anything surprised them. By circulating among the groups teachers also spot the need for help when it arises.

As in all cooperative learning situations, teachers facilitate students' reflections on the process of learning and of cooperating with their peers. Reflection informs practice. By reflecting on what one does and on students' reactions to the teacher's facilitation of the investigation, the teacher is better equipped to choose those actions that are best suited to the students' needs. Reflection also facilitates the transformation of practice: teachers and students learn how to weigh the effects of their experience in the classroom and with the help of the resulting conclusions, plan how to change their behaviors and actions accordingly (Y. Sharan, 2010).

Clearly teachers do not wait for the sixth stage of the project to evaluate their students. It is best to inform students at the onset of the project about the criteria for evaluation, and to let them be aware of the fact that the teacher observes them while they carry out their investigation. It is equally important for students to be told that teachers will not evaluate them on criteria or in ways not specified in advance.

The stages of GI, the teacher's and student's role at each stage are summarized in Table 20.1. The stages of GI are not meant to be followed mechanically. Mitchell, et al. (2008) observe that in situations where time is limited or when students may be too young or not have the requisite skills, the teacher may wish to provide more direction. Indeed it may take some time before students can carry out an elaborate investigative project. To set the stage for such a project teachers may organize short-term investigations on a narrow range of topics, each time giving students the opportunity to practice a different component of investigation, such as raising questions, searching for information in a variety of sources, and summarizing findings. In addition we would like to point out that GI is not an "exclusive" model, and at different stages of the investigation teachers often organize students in Jigsaw groups, and incorporate other CL structures (see the examples of GI projects in Y. Sharan, 1995; Y. Sharan & S. Sharan, 1992, 1994). There is even room for direct instruction, as, for example, when all groups have the same problem in organizing their information, or when it is helpful to teach the whole class some basic facts about the topic they are investigating to facilitate their understanding of the kind of information they need to collect and how to make sense of it.

Table 20.1 Stages of Group Investigation, Teacher's Role, and Students' Role

Stages of Group Investigation	What does the Teacher do?	What do the Students do?
I. Class determines sub-topics and organizes research groups	Leads exploratory discussions to choose sub-topics; facilitates organization of research	Generate questions of interest; sort them into categories; join a research group
II. Groups plan their investigation: what they will study; how they will carry out their investigation	Helps groups formulate their plan; helps maintain cooperative norms; helps find resources	Plan what to study; choose resources; assign roles and divide study tasks
III. Groups carry out their plans	Helps with study skills; continues to help maintain cooperative norms	Seek answers to their questions; locate information; integrate, summarize findings
IV. Groups plan their presentations	Organizes plans for presentations; coordinates plans with steering committee	Determine main ideas; plan how to transmit them and involve all group mates
V. Groups present their findings	Coordinates presentations; facilitates feedback	Present their findings; class gives feedback
VI. Teacher and students evaluate individuals, groups, and class	Evaluates learning of new information, higher level thinking, and cooperative behavior; facilitates reflection	Reflect on learning as investigators and on group processes

HOW EFFECTIVE IS GROUP INVESTIGATION?

Together the stages of the investigation constitute a model that is the subject of several experimental studies of the GI method in particular, and of cooperative learning methods in general (Hertz-Lazarowitz & Shachar, 1990; Johnson, Maruyama, Johnson, Nelson, & Skon, 1981; S. Sharan, 1980; S. Sharan & Hertz-Lazarowitz, 1980; S. Sharan & Rich, 1984; Slavin, 1980, 1983; Tan, Sharan, & Lee, 2006; Webb, 1982; Weigel, Wisler, & Cook, 1972). Most of the studies on GI were carried out in the period when many CL researchers were developing their own models. One of the factors that gave impetus to this flurry of development and research at the time was the desire to counter the prevailing climate in schools, which saw students solely as individuals and which ultimately failed to create schools that could effectively integrate students and raise their academic levels (Brody, 2011).

Evaluation of the effects of GI requires an experimental research design of assessment carried out before and after the implementation of GI, as well as the assessment of control classes. A unique feature of the intensive study of GI is that it involved all the teachers in whole-school experiments that lasted a year or two. Admittedly this design is quite daunting, particularly when the instructional method is new to teachers and demands drastic changes in their instructional behavior and requires extensive teacher training. These conditions were carried out in the extensive research studies on various aspects of GI, reported in the following publications: S. Sharan (1990); S. Sharan, Kussell, et al. (1984); S. Sharan & Shachar (1988); S. Sharan & Shaulov (1990); Y. Sharan & S. Sharan (1992). Data obtained in these studies about students' academic achievement, their spoken language, intrinsic motivation to learn, and their social interaction with

one another, as well as about teachers' style of talking while teaching, indicate that the GI method exerts distinctly positive effects on both teachers and students. Findings show discernible improvement in classroom climate, with teachers reporting that students enjoy their classroom experience and seem to derive far greater personal meaning from it than in the traditionally taught class. What follows are several findings from this body of research.

Students' Language in the Cooperative Classroom

One experiment, by S. Sharan and Shachar (1988), assessed the effects of GI on students' achievement, social interaction, and verbal behavior among 351 students from different Jewish ethnic groups in Israel in nine eighth-grade classrooms. We will focus on the findings of the effects of GI on students' verbal behavior.

Carrying out a GI project requires constant conversations between group members. Assessment of students' spoken language at the end of several months demonstrated its significantly superior features compared to peers who had studied in traditionally taught classes. Both the social-interactive and cognitive intellectual features of the discussions carried out by young adolescent speakers were evaluated in this study. There were 197 students in the five classrooms taught by the GI method, and 154 pupils in four classes taught by the whole-class method; 27 groups of six students per group were selected at random from the nine classrooms. These groups engaged in two 15-minute discussions (one on a subject taken from their geography textbook, a second on a subject selected from their history book). The videotaped discussions were analyzed by two judges. Each group had 7 minutes "warm-up" time before actual filming began.

Data were collected by observers who recorded verbal events whose nature was decided upon in advance. Recordings were made at the start, in the middle, and toward the end of the classroom session. The geography discussion groups were given the following instructions:

Check the atlas to find the largest concentrations of population in the United States. Discuss the following points:

- a. What are possible reasons why so many people live in these areas?
- b. What might be the consequences of the concentration of such large populations?
- c. Let's say your group is asked to advise the American government. Would you recommend that it adopt a policy of population dispersion? Discuss and explain your recommendations and have one group member summarize them in writing.

Three judges were trained to analyze the tapes according to several sets of criteria. The number of words spoken by students during the 30 minutes of their group's discussion was counted. Statistical analysis revealed that students in the GI group expressed more words than did their peers from the whole-class classes. The same was true for the number of turns they took to speak during the discussions, although the latter finding was true for students from Middle Eastern ethnic background but not for those from Western background; the latter took fewer turns in groups in the GI classes than they did in the classes taught by the whole-class method. Moreover, students from the GI classes, regardless of their ethnic-group membership, took the same number of speaking turns during the discussions, where there was a significant difference in favor of the Western compared to students of Mid-Eastern background in the frequency with which

they took turns to speak in the whole-class method. In the original publication there are extended details about the students' ethnicity that served as one of the independent variables in the study (i.e., Jewish students whose parents or grandparents came to Israel from Western countries, and those Jewish students whose parents arrived in Israel from the Muslim countries of the Middle East).

ACADEMIC ACHIEVEMENT AND SOCIAL RELATIONS IN THE GROUP INVESTIGATION CLASSROOM

The general problem posed by another study was: "Another study investigated the difference between academic achievement and social relations in mixed ethnic classes that emphasized peer cooperation versus traditional instruction" (Sharan, Kussell, et al., 1984, p. 15).

This study encompassed a number of independent and dependent variables that cannot be effectively discussed within the confines of this chapter; once again the reader is referred to the original publication. Here we will focus on the GI method and its effects on students. Some of the variables employed in the study reviewed here overlap those used in the above mentioned study by S. Sharan and Shachar (1988).

The study focused on the effects of two CL methods, group investigation and student-teams and academic divisions (STAD; Slavin, 1980), versus whole-class instruction, on three sets of dependent variables: achievement and English language and literature; cooperative and competitive behavior; and social attitudes. The report also presented an overview of cooperative versus traditional teaching and compared the findings for each of three different instructional approaches in terms of classroom climate, students' prosocial behavior, and the challenge of disseminating CL among teachers.

Results demonstrate that pupils in classes taught by GI registered greater improvement than their peers in the whole-class instruction classes on the total English Language test and on the Listening Comprehension section of the test. Pupils in the STAD classes also achieved higher scores than those in the whole-class instruction classes on the total test and on the Listening Comprehension section. These results emerged from both individual-level and group-level statistical analyses. Moreover, both ethnic groups (i.e., Jewish students from Western and from Mid-Eastern ethnic background) were affected similarly by the three instructional methods. Direct instruction proved less effective for teaching language skills than were the group methods.

The test for achievement in English literature consisted of questions classified by judges as low-level and high-level questions. The scores of students in classes taught with STAD and whole-class instruction declined from pre- to posttest administrations of the exam but remained unchanged in the GI classes. It must be noted that the two tests were not the same and were not of the same level of difficulty. These results may be interpreted to mean that pupils in the GI classes made more progress in their ability to respond to questions than did their peers taught by the other two methods. The opposite results were obtained with the low-level questions, where students in the STAD and whole-class instruction classes got higher scores than did students in the GI classes.

The distinction between high- and low-level questions was used in earlier research in Israel (S. Sharan, Hertz-Lazarowitz, & Ackerman, 1980). Cooperative learning in small groups yielded superior achievement on the high-level questions, but no differences

were found on questions assessing low-level mental functioning according to Bloom's taxonomy. Similar findings were reported in the United States (Johnson, Skon, & Johnson, 1980).

Cooperative and Competitive Behavior

Though the central role of cooperation in contemporary society is acknowledged and documented (Johnson & Johnson, 1994; Pepitone, 1980; Piaget, 1948; Thelen, 1960), a great deal of research has classified cooperation as an independent variable, even in studies of cooperative learning.

In the present chapter cooperation is treated as a dependent variable, as it is in studies of the effects of students' ethnic identity on their behavior (Kagan, 1980; Kagan & Madsen, 1972; Madsen & Shapira, 1970; Shapira, 1976). One of the conclusions from this body of research is that children's personality characteristics interact with the structure of classroom instruction. Children who grow up in a cooperative society encounter great difficulty in adjusting to the competitive classroom that prevails in the United States, Israel, and other countries (Kagan, 1980). Without implying any causal relationships, research has shown that children from competitive cultures express high self-esteem when they live up to their competitive norms. In our time, "cooperative societies" are likely to be economically and industrially far less developed than allegedly competitive societies. There is also evidence to show that even children who are considered to be "competitive" in terms of their personal orientation adapt well to cooperatively run classrooms and, when asked, say that they prefer cooperative to competitive classmates (Blaney, Stephen, Rosenfield, Aronson, & Sikes, 1977).

STUDIES OF STUDENTS' PERCEPTIONS OF GI

In another study several hundred children in Grades 3 through 7, who participated in a 1½ year experiment to implement GI, were asked to write letters to the researchers about what they thought and felt about their experience (Hertz-Lazarowitz, Sharan, & Shachar, 1981). They mailed their letters directly to the researchers so no one in their schools—teachers or peers—would know what they wrote. Content analysis of the 400 letters identified 692 statements that were categorized and counted by independent judges. The category that appeared most frequently in the students' statements was that they liked studying in small groups because they could help each other; this promoted learning and prevented failure. The same study showed that the children made significantly more altruistic and cooperative decisions on a task that asked them to allocate resources to themselves and classmates (the "chocolate coin game"). Similar findings about students' preference for cooperative classrooms were reported by other investigators (Aronson, Bridgeman, & Geffner, 1978).

GROUP INVESTIGATION IN ETHNICALLY HETEROGENEOUS CLASSROOMS

Another problem posed by S. Sharan, Kussell, et al. (1984) was: Do three instructional methods—group investigation, student teams and academic divisions (Slavin, 1978, 1979), and whole-class instruction—exert differential effects on children's cooperative behavior cross-ethnically and with same-ethnic peers? The focus of the study was

on overt social behavior, rather than on attitudinal change or friendship patterns as expressed in socio-metric measures (Hansell & Slavin, 1981).

Six-member groups of Jewish students (three from a Western background and three from a Mid-Eastern background) were selected at random from a given class and were allowed a maximum of 30 minutes to complete the construction of the figure of a man using Lego blocks. Some groups completed the task in less than the allotted time. Results recorded by observers indicate that the GI method generated more cooperative behavior during performance of the task than did either of the two other methods. STAD students displayed more cooperative behavior than did those in classes taught with the whole-class approach (nonverbal); and conversely, students in the GI and STAD classes were less competitive than those who studied in the classes taught by the whole-class method. Statistical analysis of data gathered with the Lego-man task shows that with the whole-class category competition is the dominant factor. No findings for ethnic group emerged in the data obtained with the chocolate-coin game.

From the findings reported in this study we learn that:

- a. Whole-Class instruction produces more competitive behavior both within and between ethnic groups than do GI or STAD.
- b. The GI method generates more cooperative exchanges among students from both ethnic groups and between ethnic groups than does the whole-class method.
- c. GI promotes almost complete reciprocity in cooperation, whereas in classes taught with either STAD or the Whole-Class method, the Middle-Eastern background students, who were of lower social status than their Western background peers, directed twice as many cooperative acts to the Western background students than the latter did to their Mid-Eastern classmates. (S. Sharan, Raviv, Kussell, & Hertz-Lazarowitz, 1984, p. 96)

What accounts for the diverse effects of the GI and STAD methods on students' cooperative behavior? In our view the answer can be found in the manner in which the instructional methods structure students' relationships with one another. STAD structures interaction between group members so that students with a relatively higher level of academic success offer assistance to those with a lower level of achievement. That approach can easily create a "division-of-labor" within groups along ethnic lines. Minority-group students become *recipients* of help from the majority-group students, who are identified as *dispensers* of assistance (S. Sharan, 1980, p. 260). In any case, the relationships are not symmetrical, at least not in the findings reported in the study conducted in 1984 (see S. Sharan, Raviv et al., 1984, p. 97). STAD did not promote cross-ethnic cooperation, so that the status hierarchy in the classroom was not changed.

In contrast with STAD, GI assigns a portion of the task to different students without assigning them to a social role that may have implications for the minority-majority relationship between them. Moreover, helping a fellow student in a group is not a function of knowing more about the academic material that was presented earlier by the teacher. Each student investigates a particular subtopic in order to contribute his or her share to the final group product. All members acquire status in the group through reciprocal exchange rather than by dispensing or receiving assistance.

RECOMMENDATIONS FOR FURTHER RESEARCH

One recommendation for future research focuses on the school as an organization and on the professional staff, rather than on the students. A question that deserves a considerable investment of time and effort is: Just what are the organizational features of a school that will most likely be inclined to adopt instructional innovations in general, and the Group Investigation method in particular? Often school consultants spend months or even years working with one or several schools that agree to adopt a particular innovation in classroom teaching methods, only to learn that during the process the project is abandoned. The change is not just on the level of curricular contents (S. Sharan & Tan, 2008). One of the reasons why schools unexpectedly changed their minds is because the principal or teaching staff recognizes that the innovation requires genuine change in their professional behavior.

Secondary schools are particularly resistant to significant change. A very substantial percentage of them have not adopted any noteworthy change in decades. Why this is the case, and how to overcome the obstacles preventing change in instructional methods used by secondary schools, deserves more attention from educational authorities, from educators from a variety of disciplines, and from educational research. Findings from extensive research in this area will, we hope enable educators to focus on the most relevant factors impeding change and redirect resources and personnel accordingly. The current situation in respect to changing instructional methods in secondary schools brings to mind the title (and contents) of Sarason's classic work, *The Predictable Failure of Educational Change* (1990). Providing more of the same investments in change can lead only to the same results. Authentic and sustainable implementation of innovations such as the Group Investigation method of cooperative learning calls for an organizational approach to change that goes far beyond the functioning of students as individuals.

Another recommendation for research on the effects of GI is in the field of intercultural education, the urgent challenge that many schools face today. We believe that GI offers diverse learners the opportunity to harness their cultural differences in the pursuit of their learning goals (Y. Sharan, 1998). It would be helpful to study how a GI project in the intercultural classroom actively involves students' varied backgrounds and learning styles. Does the sharing of responsibilities for the investigation create conditions that help students of different backgrounds and abilities gain status and acceptance among their peers? Is GI or its components a good vehicle in today's intercultural classroom for helping students and teachers realize that the different interests, backgrounds, values, and abilities of group members are in fact the group's greatest asset and enrich the class's pool of resources for expanding knowledge? What adjustments and modifications can be made in the GI process in light of different cultural contexts?

CONCLUSION

In this chapter we have revisited the rationale and methodology of GI that grew out of Dewey's vision of learning as a process of inquiry in a social context. By encouraging learners to build on the knowledge they construct during the process of inquiry, Dewey may also be viewed as one of the early proponents of "constructivism" in the psychology

of thinking and learning (Vygotsky, 1962, 1978). The belief in these views of learning, combined with the contributions by the group dynamics school of psychology, inspired Thelen to develop Group Investigation, a systematic model of inquiry-based learning. We have shown how GI is validated by the thorough research conducted by Sharan and his colleagues.

Though not always explicitly acknowledged, Dewey's vision of education continually resurfaces in different inquiry-based learning models, designed by practitioners and researchers. An intriguing example is the one presented by Murgatroyd (2010), who calls for teachers to present "wicked problems" to their students; that is, complex and challenging problems based on genuine community or organizational needs. While the inquiry into sources and the creation of possible solutions to these problems address curriculum needs, they go beyond them to enable students to "experience the fact that their knowledge and understanding can make a difference to a community" (Murgatroyd, 2010, p. 268). This goal is similar to several other projects and models: the "Environmental Studies Project" cited above, the more structured "Roots and Wings" project developed by Slavin and Madden (2001), the Complex Instruction model, developed at Stanford University (Cohen, 1994), "Coop-Coop" (Kagan & Kagan, 2009), and "Comprehension and Collaboration: Inquiry Circles in Action" (Harvey & Daniels, 2009). Each of the permutations of Dewey's vision of education has a unique focus, yet all seek to develop thinking and decision-making skills in the process of inquiry, to provide students with opportunities for finding creative solutions to real life problems, to nurture cooperation and mutual help, and to enlist the use of appropriate technology, all of which are as vital to society today (Sahlberg & Oldroyd, 2010) as when Thelen initially shaped Dewey's ideas into Group Investigation.

Group Investigation can now be seen as a classic model of inquiry-based learning that provides the basic guidelines for this approach to learning. It is our hope that the GI model will continue to evolve and enable teachers and students to experience the emotional involvement, the mental stimulation, and the cooperative behaviors that make it an authentic learning experience.

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