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ABSTRACT

Cooperative learning aims to enhance students' on-task interactive behaviors in the classroom. Observation in Israeli elementary schools has indicated that interactive behavior of students in their learning sequence holds potential for quality cooperation and help among children, but that teachers lack the skills to structure learning tasks that will enhance a high level of cooperation. Based on prior research an integrative model of the classroom was developed, and a detailed developmental stage taxonomy was suggested to describe, explain, guide, and predict students' cooperative interaction in all types of classroom structures. The model is based on six related dimensions: (1) the physical organization of the classroom; (2) the nature of the learning task; (3) the instructional mode of the teacher; (4) the communication pattern of the teacher; (5) student social-learning behaviors; and (6) students' academic-cognitive behavior. This model and the research that followed indicate that variation in learning task structures and teacher behavior are the main factors in shaping students' behaviors. The inclusion of cooperative learning as part of the daily experience in the classroom is proposed. (JD)

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AN INTEGRATIVE MODEL OF THE CLASSROOM: THE ENHANCEMENT OF COOPERATION IN LEARNING*

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Abstract

Cooperative learning aims to enhance students' on-task interactive behaviors within the context of cooperative classrooms. One major limitation to the attainment of this goals, is the reality that most classrooms in the Western society are non-cooperative in nature and emphasize individualistic, competitive, technological and non-interactive structures of learning.

In an experimental project of active - learning in Israeli elementary schools, a wide variation of learning structures takes place. Observation in those classrooms indicate that interactive behavior of students in their learning sequence hold potential for quality cooperation and help among children, but that teachers lack the skills to structure learning tasks that will enhance high level of cooperation, both in the structural elements of cooperation, and in the cognitive - academic level of the interactions.

Based on former work by Steiner (1975), Bossart (1976), Sharan and Hertz-Lazarowitz (1978, 1980), an integrative model of the classroom was developed, and a detailed developmental stage taxonomy was suggested to describe, explain, guide and predict students' cooperative interaction in all types of classroom structures; from the very rigid frontal classroom to the complex-cooperative classroom.

The model is based on six dimensions that are related to each other. (1) The physical organization of the classroom. (2) The nature of the learning task. (3) The instructional mode of the teacher. (4) The communication pattern of the teacher. (5) Student social-learning behaviors, and (6) Students academic-cognitive behavior.

The model and the research that followed indicates that variation in the learning task structures, and teachers' behavior - are the main factors in shaping students' behaviors. (Hertz-Lazarowitz 1989). The inclusion of cooperative learning as part of the daily experience in the classroom, is proposed.

Introduction: What are students doing in the classroom[1]

The question, "what are students doing when they are engaged in academic work in the classroom," seems an obvious question with ready made answers. Many verbs describe students' behavior in the classroom: learn, study, listen to the teacher. They write, read, and do seatwork. They ask and answer questions, chat, daydream, and wait for the bell to ring. There is a universal rhythm of "life in the classroom", described in numerous qualitative and quantitative accounts (Jackson, 1968; Hertz-Lazarowitz, 1984).

What are we looking at: Teachers or students?

Historically, classroom research focused on teachers' behavior. The general assumption, mainly in the sixties and seventies, was that teachers should practice a great variety of instructional behaviors in order to keep students alert, interested, and engaged in academic work (Flanders, 1970). In the late seventies, the focus of research and observation shifted to student-behavior. This shift was intensified by the title "Looking in classrooms", an influential book by Good and Brophy (1973). Soon after that, the field of students' behavior became interdisciplinary; linguists and sociolinguists joined psychologists and educators to supplement descriptive-phenomenological methods, mainly to analyze communication in different classroom settings (Wilkinson, 1982; Cazden, 1986; Evenston and Green, 1986).

Most of the research was conducted in traditional classrooms. In this context, teaching is expository-frontal. The "classroom" was related to a physical entity of a room, with one teacher and 30-40 students who were treated as one collective group. Thus, in such a setting, students are usually perceived by teachers and by researchers of the classroom as a passive audience.

Classrooms as complex social systems

Recently, researchers increasingly perceived the classroom as a complex social-academic system. It's main components are physical organization of the classroom, the structure of the learning task, the instructional and communication patterns of the teacher, and the social and academic behaviors of the student (Sharan and Hertz-Lazarowitz, 1980). Students' social and academic behaviors are the *outcome* of the pattern in which other dimensions of the classroom function, insinuating that students' behavior can be either passive or active, depending upon the specific classroom context (Hertz- Lazarowitz 1984, 1989; Hertz-Lazarowitz, Fuchs, Eisenberg and Sharabany, 1989).

Two main theoretical frameworks contribute to the legitimization and value of pupils as active participaiors: social-cognitive theory (Vygotsky, 1978) and the social psychology of contact (Allport, 1954) and cooperation (Deutch, 1949) Formal learning methods, known as cooperative learning (Sharan and Hertz-Lazarowitz, 1980; Slavin, 1983), combined these theoretical frameworks into practical instruction (Slavin, in press; Sharan, in press). Investigators of the classroom, however, have paid only limited attention to it as a complex social learning entity. The few notable exceptions (Getzels and Thelen, 1960; Thelen, 1981) highlight that paucity. Morever, most theory and research on the classroom is unidimensional, focusing on the effects of one or another set of variables to the exclusion of others.

Mirrors of the classroom: An integrative model

The Model:

The model consists of six interrelated mirrors (dimensions).

1. Physical organization of the classroom
2. The learning task
3. Teacher behavior: instructional

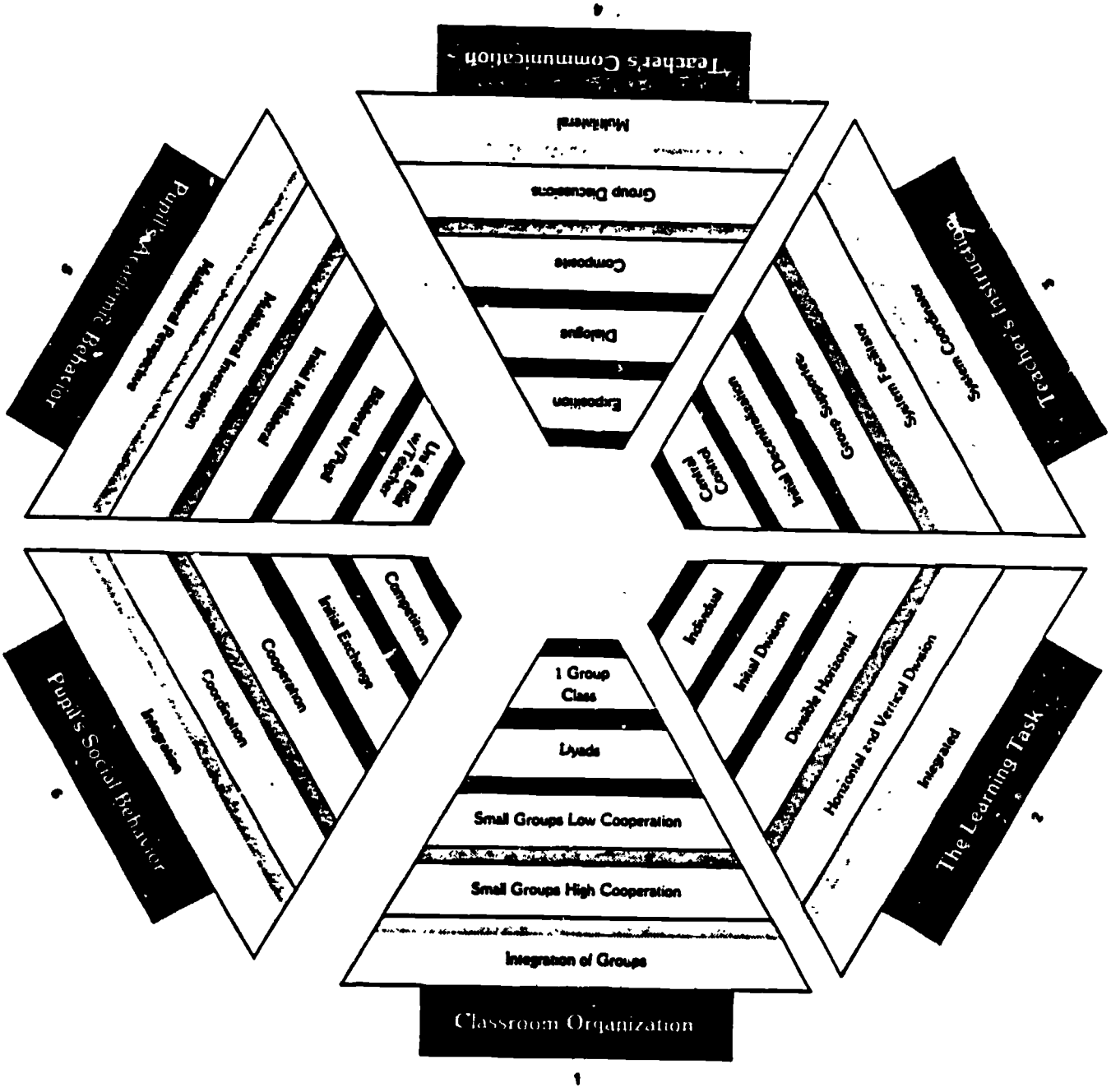
4 Teacher behavior: communication

5. Student behavior: social skills

6. Student behavior: academic skills.

MAP 1

Figure 1: Six Mirrors of The Classroom



I use the metaphor "mirrors" to express the view that the dimensions that characterize the classroom setting are interrelated; structures and activities are reflected in each dimension.

The relationship among them can be viewed as ranging from maximum coordination and harmony to minimum coordination and disharmony. When the classroom is functioning on similar levels of complexity in each of the dimensions, it is perceived as "harmonious". It is suggested that when this harmony takes place on a high level of complexity, students' academic and social behaviors become more interactive and result in a higher level of thinking

Looking in the mirrors of traditional and cooperative classrooms

Comparison of a traditional-expository classroom, to *a* cooperative classroom will illustrate and clarify the mirrors of the model.

The traditional classroom is usually perceived as a single social system, "the class as a whole". Its structure aims to maximize the isolation of students from one another by seating arrangements such as rows or individual desks. The teacher is the center of activity. He/she controls all communication networks and presents the knowledge to the pupils (teachers' mirrors). The learning task is structured as individualistic or competitive, (Johnson and Johnson, 1975) No cooperation is usually required or even tolerated in means, processes, or outcomes of learning. Moreover, most of the learning tasks are presented to the class as a collective, but are unitary (indivisible) and each pupil is expected to complete work mainly by referring to the printed sources of information (task dimension) (Steiner, 1972; Bossart, 1979).

In such a classroom, pupils are expected to listen and to respond to the teacher only when called upon to do so. Student-student interactions become minimal and

each student looks after himself/herself (student's mirror). This classroom context presents harmonious functions of the traditional classroom, as presented in the first levels of complexity of each of the mirrors in the classroom model, if the reader observes the picture horizontally.

If we look at the upper levels of the model it relates to a classroom that works in complete cooperation, such as the Group-Investigation method (Sharan and Hertz-Lazarowitz, 1980). In such a classroom, the same six dimensions exist but in different forms. In this classroom the class functions as a set of small groups or "group of groups", more typical of a complex social system (dimension 1) The learning task is of a divisible and/or investigative nature. It deals with multi-faceted problems rather than with indivisible tasks that can be solved by a single correct answer that requires a one dimension perspective only (dimension 2). The teacher offers guidance and assistance to develop the skills that pupils need as members of relatively autonomous groups and acts as a facilitator of learning or as a resource, rather than as a dispenser of information (dimension 3). As a result, pupils use the social interactive and cognitive skills required to carry out their learning task. They exchange information, generate ideas, and participate in active information gathering as well as in multilateral communication networks. They take on various social roles in the learning process: leaders, planners, investigators, etc. Their social cognitive behaviors will follow the active-constructivist approach to learning rather than the passive-receptive approach typical of the former example (dimension 4).

These two short descriptions present the basic characteristics of the integrative model. They emphasize that the context of instruction, communication, and the learning task within the specific organization of the classroom are inter-related in a systematic way, and cannot be isolated in observing and studying interaction.

Thu following section will present each dimension in some detail Each mirror actually constitutes five components within itself, characterized by increasing level of complexity.

1 Physical organization of the classroom

Every classroom functions, first and foremost, as an organization of some kind. This organization is determined, primarily though not exclusively, by the teacher. Sometimes, classroom organization is dictated by circumstances beyond the teacher's control, including school policy or even physical features of the classroom. In taking a closer look at dimension 1, we see that it depicts the structural-organization which ranges from a one group class to a classroom consisting of a "group of groups".

The classroom can be organized as a centralized system with the teacher as the main figure and with the students forming a single large group (level 1). This organization is generally referred to as the "traditional" classroom. On the other end of the continuum, the classroom can also be conceived as a decentralized organization with many smaller units (groups) operating simultaneously within the classroom. This organization is a group of groups (level 5).

The organization of the classroom from level one to five becomes more complex and more flexible in terms of territory assigned to teachers and students for learning activities, and in levels of cooperation among group members and between groups. As classroom organization becomes more complex, there is a concomitant increase in interaction, cooperation, and help among individuals and groups. The *quality* of those interactions is dependent on the levels of other dimensions of the classroom. The frequency of interactions is affected to a great extent by the classroom's physical organization.

2. **The learning task**

Very often, teachers perceive the learning task as the single most salient component of classroom activity. Completion of learning tasks is the object of the classrooms' production process. Students are well aware of the fact that they are evaluated and graded by the teacher depending upon the degree of successful completion of the tasks. Structurally, learning tasks vary in levels of complexity, determined by the pattern of division of the task and integration of the learning products. As depicted in dimension two of the model, the least complex level is the unitary task where every pupil must complete individually the same task in its entirety. In its initial division, the task is divided among two or more individual students. In horizontal learning, the task is more complex and each of its components is assigned to different individuals in the group. Once the initial learning has been completed, the different components are combined Each subsequent level incorporates the level just below it.

In the vertical structure, there is an additional elaboration of the horizontal structure that cuts across tasks, such as for example, the identification of differences or communalities among tasks Finally, in the fifth level of complexity, the integrated task, all information is integrated to form a cohesive whole, or alternatively, the basis of yet a higher level question or a new question to be integrated with existing answers (Hertz-Lazarowitz and Fuchs, 1987).

3. **Teacher behavior: Instructional**

Dimension three in the model depicts the behaviors of the teacher as an instructional leader. The levels of complexity vary from centralization of the teacher's role, where the teacher's main pattern of instruction is lecturing and fully controlling students' responses, to a decentralized style where decision making processes are distributed among groups of students. The latter style presents the

teacher as a facilitator for students' learning and interaction, rather than as the central focus of classroom life and the primary source of knowledge. The teacher thus becomes the guide on the side, not the sage on the stage.

4. **Teacher behavior: Communication**

Related to the teachers' behavior as an instructor is his/her behavior as communicator and organizer of communication-networks in the classroom. The communication mirror is defined in patterns developed by Thew (1975). and elaborated in Hertz-Lazarowitz and Davidson (1990). Teacher communication networks range from expository unilateral lectures to bilateral and multi-lateral systems existing on several levels: teacher to individual, teacher to small group, teacher to whole class, and teacher as an initiator of communication among and between groups.

In the most complex pattern of organization of communication, teachers focus on encouraging the communication among students and between groups. usually by facilitating planning, investigation, and reports. Teachers determine webs of communication in the classroom by introducing composite, coordinated and integrated networks of communication.

5. **Student behavior: Social skills**

In order to play the role of a student and a learner student need to acquire social skills. One categorization for those skills relates them to individualistic, competitive, and goal structures (Johnson and Johnson, 1975, 1989). In the "mirrors model", levels of complexity range from non-interactive to interactive behaviors, and later to cooperative and integrative behaviors. The least complex social behavior is when the student functions as an isolated individual member. Isolation can be perceived as "you swim, I swim" (individualistic) or as "I swim, you sink",

where highly competitive student success is built upon the failure of other classmates. Social skills of both individualistic or competitive modes are less complex as compared to learning that requires interaction between students. Academic exchange in learning calls for a give and take type of social skills and the distribution of resources in social an academic domains. The students' level of cooperation once introduced, ranges from low (such as sharing resources) to high, which in my view, includes all sequences of action, i.e. input, process, and output The most complex social skills students have to practice are those that require coordination, integration and synergy. Being a member of a highly cooperative team calls for complex social skills such as participation, taking turns, relating to others contribution, debriefing about the cooperative processes, reflecting on the content and form of one's own interactive behaviors as well as on that of others (see also Sharan & Hertz-Lazarowitz, 1978, Hertz-Lazarowitz and Fuchs, 1987, Hertz-Lazarowitz and Davidson, 1990).

6. Student behavior: Academic skills

The two mirrors of student behavior, social and academic, are closely interrelated. The more differentiated the social organization of the classroom, the more complex the two mirrors become. Academic skills range from simple and passive, such as listening or interacting only with the textbook and /or the teacher, to highly complex, where evaluative and creative academic skills are necessary to synthesize several sources of information. Complex academic skills take place usually within an interactive context of learning. Because the dimensions of students' social and academic behaviors are the focus of my own research, these mirrors are further elaborated in the later sections of the chapter.

Integrating the mirrors of the model

There are several ways to integrate the information of this model. We can first view each mirror separately looking vertically from the center outward and downward through structures. This vertical arrangement suggests a continuum of complexity, with the lower structures being on the most highly sophisticated levels. Furthermore, this model suggests the teacher to gradually progresses downward step by step rather than skipping over levels or carrying out the process too rapidly.

For example: If we look at the Task mirror, the second level is entitled initial division, and the third level is entitled divisible- horizontal. The assumption is that initial division is more complex than individual task, and less complex than the third level of divisible-horizontal. An example will clarify this. For initial division, it is suggested that teachers will structure tasks for dyads, and ask them to work mainly as individuals. However, the element of cooperation is introduced by adding activities such as mutual checking, comparing or listening to each other answers. This level requires student to exhibit social skills such as listening to each other and exchanging simple feedback. Academically, they are asked to compare or check for accuracy, usually with a ready made teacher answer sheet. The STAD (Student Team Achievement Division) method frequently uses this task structure (Slavin et al 1985).

When the teacher assigns learning tasks that are divisible- horizontal, each member of the group (usually 3-5) is responsible for one part of the content, and the group is working toward a combined product. The Jigsaw method (Aronson et al 1978) is based on such tasks. In this level of task, students are required to be engaged in more complex social and academic behaviors, and thus need more complex skills in those dimensions. Usually the time alloted for the cooperative process increases, and in the social behavior dimension students exercise

attentive listening, taking turns in participation, keeping a time schedule, performing social roles, relating to each other etc.

Academic behavior is cognitively more complex as students need to recall, teach, summarize and combine information (O'Donnell and Dansereau, this book). Similarly, each following level is becoming more complex in the learning task structure, and in the behaviors required from the inter-related mirrors of the classroom. Thus we propose that there is a developmental notion involved in this model, and we suggest that, both teacher and the pupils master the necessary skills at each step before proceeding to the next one.

We can also view the chart horizontally, looking in a circular fashion around each structure. Since we have emphasized the idea that the mirrors are interrelated, we can then suggest that for maximum efficiency and best results, different activities in the classroom should be linked with their coordinating structures from the other mirrors. Within a given period or day in the classroom, the teacher can successfully design several different activities using different structures. The teacher thus becomes the architect of the classroom, attempting to best match the learning task to his/her own role as instructor and communicator within a given organization. This process will determine the context of the classroom.

The research conducted in Israel focused on student behavior. We investigated the impact of traditional and cooperative classroom contexts on those mirrors. In order to empirically study this, we needed to develop an operationalized system of observable categories of behaviors. The following section presents the "four channels" taxonomy.

Four channels of student learning in the classroom

Students' behavior can be described on two axis: on-task, vs. off-task and interactive vs. non interactive. This 2 x 2 taxonomy encompasses the full range of all student behaviors. For example, a major body of research studies on-task and seatwork behavior (Anderson, 1984, Karweit and Slavin, 1981). In the current conceptualization, those behaviors are defined as on-task non-interactive behaviors. On the other hand, cooperation, help, and peer-instruction are defined as on-task interactive. Disruptive behaviors, such as discipline problems, management, chatting or fighting, intersect as interactive off-task behavior. Finally, withdraw and day-dreaming constitute off-task non-interactive behaviors.

An important advantage of this four cluster conceptualization is that it affords analysis of all student classroom activity. Within this context, we can see that clusters studied and observed during the past two decades reflected the educational ideology of the era. 'Time-on-task' research flourished in the late seventies. It put disproportional emphasis on intra-personal processes, and was based on the erroneous assumption that the more students are engaged in solitary time on a task, the better the academic outcome. In fact, research both in the USA and Israel documented that much of such time on task is not highly correlated with academic achievements (Anderson, 1984; Slavin and Karweit, 1981; Hertz-Lazarowitz, 1985). Often, such behaviors turned to be low-level busy work on filling-in worksheets.

More recently, focus has shifted from time on task in a non- interactive mode to the study of on-task, interactive behaviors. This shift was influenced by the theories presented earlier, and by an impressive body of research on peer-interaction in learning (Brown and Palinscar, in press; Dansereau, 1988; Webb, 1989; Damon, 1989; Hertz- Lazarowitz, 1989; Johnson and Johnson, 1989; Slavin, 1989; Sharan and Shahar, 1988). On-task interactive cluster is important and

meaningfully related to academic outcomes, however, analysis of the total range of stundents' behaviors is still necessary. The new focus on cooperative and interactive behaviors precludes analysis of other students' behavior, and once again, omits the full spectrum of student behavior within distinct learning contexts.

Because there is an interdependence among clusters, and usually interactive and non-interactive on-task behavior complement each other, the research has to account for changes in quantity and quality of these two channels. Studying isolated categories of behavior, might distort the understanding of the complete dimension of student behavior. For example, helping interactions are quite rare in the classroom (Hertz-Lazarowitz, 1983). Analyzing their correlation with academic achievement (Webb, this book) only might be more powerful if the observations will include and test correlation with other on-task behavior Furthermore, helping interactions are different in their cognitive-academic characteristics depending on the learning task in hand, and the overall amount of student on-task interaction (Hertz- Lazarowitz, 1989). Thus, the studies conducted in the contextual framework focused on the full repertoire of student behavior. This seems to be an important link to investigate the effect of different arrangement of classrooms in the different mirrors (configurations) on student behavior and in turn on academic-cooperative processes and products.

Research on student behavior

The research program and methodology

Following the integrative model of the classroom ten studies were conducted during the years 1983-1989. In all the studies naturalistic classroom observations included coding the full range of behaviors for *all* the students in a given classroom for the lesson observed. The dependent variables were student behaviors, whereas we systematically varied the independent variables to test the effect of

one or more mirrors of the model on student behaviors in general, and cooperation and helping, in particular.

Categories for observation

Specific behavioral categories were defined in my own research. These six major behaviors are presented in Table 1.

Insert Table 1 here

According to these definitions, and based on the the four channel taxonomy, solitary on-task and solitary off-task represent non-interactive behaviors, while cooperation, helping and teacher-student interactions represent interactive on-task behaviors. Social events represent off-task behavior. Interactive on-task behavior particularly cooperation and helping were elaborated on and included additional structural elements (Steiner, 1972; Hertz-Lazarowitz and Fuchs, 1987; Sharan and Hertz- Lazarowitz, 1980) and cognitive-reasoning levels (Bloom, 1956). Cooperation was defined as simple (low) or complex (high), based on the characteristic of the learning task and whether students cooperated in means, process, and/or outcomes. Cooperation was defined as complex only when observation indicated that the process of the learning was regulated by on-task cooperative and interactive behaviors.

The content of the verbal interaction in cooperation and helping was analyzed according to levels of reasoning: informative, applicative, and evaluative (Bloom, 1956). In this way the level of thinking was embodied in structures of interactive behavior. Finally, based on the literature on helping behavior, differentiation was made as to the *role* (giving or receiving) and *type* of help (voluntary or

non-voluntary) (Hertz-Lazarowitz & Sharan, 1984). Table 2 presents the definitions of the cooperative interactions.

Insert Table 2 here

Observations on students' behavior were conducted in different configurations of classrooms in order to test the impact of different learning contexts on the full range of student behavior, cooperation and helping were the foci of the research.

Procedure

The studies were conducted within three main types of classrooms: traditional, non-traditional (but not cooperative), and cooperative learning. Our procedure used an elaborated version of Altman's (1973) method of instantaneous sample procedure, which was initially developed to observe young children in natural play. It includes a short observation of the student (child), coding his/her behavior on a pre-coded set of categories. The observer moves from one student to another to record the appropriate category of behavior. Randomization of order of timing, and location ensures unconfounded observation of all students. By obtaining a large number of observations it ensures a representative sample of student behavior.

In studies that observed traditional instruction, where most of the seating arrangements were in individual rows, the schedule included observation of individual students, one after the other. In each lesson, three cycles were conducted, each circle included 15-18 students and lasted ten minutes. Thus 45-54 segments of behavior, per lesson, were coded. The observer approached the target student and observed him/her, coded the category of his/her behavior, and then proceeded to the next student in the row. When students were interacting, the

observer listened to the content of their interaction, recorded the categories and further coded its cognitive level. Lastly, transcripts of sample interactions between students were taken (a detailed description of the procedure and an example of the observational form is presented in Hertz-Lazarowitz, Baird, Webb and Lazarowitz, 1984).

In the second phase of the research, when we observed non-traditional classrooms, such as learning centers (Hertz-Lazarowitz, 1984) and active classrooms (Hertz-Lazarowitz, Fuchs, Eisenberg, and Sharabany, 1989), the instrument was re-designed for group observation. In these classrooms, the observation began a few minutes after the beginning of the lesson. A target group of five-six pupils was randomly selected, and although the observer basically followed the same procedure, more time was allocated for recording students' verbal interactions. Thus, the observation included the pre-coded category based procedure, and an open observation. (See Hertz-Lazarowitz, et al. 1989 for a full description of the method).

The third phase of the research observed classrooms that used cooperative learning. In this research, more detailed categories were defined and analyzed in order to examine unique aspects ofrver cooperative interaction (Maskit, 1986, Maskit & Hertz-Lazarowitz, 19[illegible], 1989). In all studies, the physical arrangement of the classroom, the content area of the lesson, and the students' learning task were carefully described.

Findings

Student behavior in traditional classroom contexts

The first two studies observed elementary (Hertz-Lazarowitz 1983) and high school students in Utah (Hertz-Lazarowitz, Baird, Clark, Webb and Reuven Lazarowitz 1984). The naturalistic observations presented earlier were conducted

in traditional classrooms. The content area of different science subjects (biology, earth science), instruction variations within the traditional context, and grade level (age) were the independent variables.

Our specific aims, some of which paralleled the more general one's posed earlier,

a. To develop useful measures for a general description of student behaviors in traditional classrooms. Such baseline measures were necessary for further examination of the model.

b. To assess whether interactive behaviors are indeed those that are most sensitive to classroom contexts? If so, even instructional variation within traditional contexts (such as lecture vs. whole class discussion, laboratory work) should affect interactive behavior.

c. To find if student behaviors remain stable across age and grade levels.

We studied traditional classrooms first because they are the most prevalent type in western schools today. We conducted naturalistic-observational study on 700 elementary school students in Israel Though the sample included schools from distinct demographic (Jews, Arab and Druze), and geographic sectors (city, villages, kibbutzim), there was little variation in outcome as a consequence of these factors. Our results show that the four cluster conceptualization is valid and describes what students do in the classroom, in different cultural settings. The main findings were as follows:

a. **On-task solitary**, is by far the most dominant behavior of students in the traditional classroom. About half (50%) to three quarters (75%) of observed behavior fell into this cluster. With increasing age, however, the frequency of on-task (non-interactive) behavior of students decreases.

b. **On-task interactive behavior**, in the form of cooperation and helping naturally occurs in traditional classrooms. These behaviors are relatively rare, and comprise 10-18 percent of students' observed behavior. This finding

was stable across grade level (age). However, the Israeli children did interact slightly more in cooperation and helping (about 15%-18%) compared to American students (10%-15%) (Hertz-Lazarowitz, 1989, Hertz-Lazarowitz, in press).

c. Most **on-task interactions** were of short duration. These interactions were performed by students in an "underground" way, because the teacher provided no legitimization for it. As one child put it "The teacher says we should help each other, but she then tells us to be quiet. How can you help your friend without talking?"

d. **Off-task interactive** behavior is the second most frequent behavior of the four clusters. Social event interactive behavior constitutes 15-30 percent of the total behavior observed. This cluster's share increases with age, and is found to be more frequent among high school students.

e. **Off-task non-interactive** behavior is the most difficult cluster to code. Differentiating between listening and daydreaming is typically impossible. We could reliably code only about 5 percent of such behaviors. Thus, it may be that a small part of on-task solitary behavior is confounded with off-task non-interactive behavior.

f. Finally, **teacher-student interaction** was coded when one-to-one interaction between student and teacher took place and not when teacher talked to the whole class. It accounted for only 7-8 percent of our observations.

On the basis of these findings, we proposed a general rule for traditional contexts: *"One third of behaviors are interactive, and half of them are off-task."* We propose that students are engaged in such behavior because they *need* peer-interaction in the learning process for their own cognitive and social development. If the context is highly solitary and non-interactive, students will look for legitimized and unlegitimized avenues of interactions. In classrooms that are mainly non-interactive, as they progress in age and grade level (11th-12th), they increase their "social events" behavior, which is off-task interaction. This increase

is perceived by teachers as an indication of growing discipline problems. However, for the students, it is an avenue to fulfill their needs for interaction. If such interaction is not channeled into legitimate academic processes, it emerges as social events.

Student interaction in cooperative contexts

Very few studuies observe the full range of students' behavior in classrooms instructed in cooperative learning. The term itself suggests that cooperative-interaction should be the most salient behavior for students in this context, however, an emphasis on the *process* events that occur during cooperative interaction is not endorsed by all cooperative learning researchers. For example, Slavin emphasizes the *reward* structure as the key characteristic (Slavin, 1983, 1989). In my own thinking, the nature of student interaction defines cooperation. Thus, the question what (and how much) is cooperative in cooperative learning seems an important research-observational issue (Maskit & Hertz-Lazarowitz, 1989).

Some cooperative methods, despite their cooperative reward or goal structures primarily induce individual on-task non-interactive behavior. Moreover, in some methods, elements of competitiveness are more salient than elements of cooperation. Instead, my own concept of cooperative learning emphasizes a high frequency of interaction among students. These interactions should take place in the context of a cooperative goal (task) structure, and a within cooperative-interactive process. For example, in the Group Investigation model developed and experimented by Sharan and Hertz-Lazarowitz (1980), and further described by Hertz-Lazarowitz & Fuchs (1987), we omitted external reward structures, and proposed that internal motivation and involvement of students in challenging and interesting learning tasks will have the motivational potency to increase their academic achievements Complex processes of

cooperative-interaction are instrumental in achieving this outcome (similar viewpoints are expressed by Cohen, 1986; Damon, 1988).

The studies conducted in Israel support this assumption (Sharan and Hertz-Lazarowitz, 1980, 1984; Sharan, Kussel, Hertz-Lazarowitz, 1984: Shachar, 1986). The reward and goal structures are not sufficient to ensure a *cooperative* process of learning. (Miller & Davidson Podgorny, 1987). In the Group Investigation method students plan together what, how, and why to study a certain topic. Indeed, in such a context, students interact in order to take charge on their own learning, with the assistance of the teacher. They decide on the division of work among themselves, plan their learning tasks, and assign them on the basis of self-interest by self-selection processes. The Group-Investigation learning process incorporates unitary, divisible, and combined learning tasks, to produce a group product. When each group presents its project and teaches it to the other groups, an integration of the different sub-topics of the theme is achieved.

An important step in our research was to observe groups in cooperative contexts in order to describe the nature of cooperative interaction. Maskit (1986) developed a cooperative method called "the circle", in which four cooperative elements, namely selection, specialization, sharing, and group production are introduced *after* teacher presentation of a general background, and after each member read the *same* story, poem, or essay. In the cooperative phase of the lesson, several learning tasks are presented to the group. In a process of negotiation, each students makes his/her selection of the specific learning task, then specializes in it, and after that presents it. The group then discusses each presentation. In the final stage, the group combines individual outcomes and integrates them into a group product. This method incorporates elements of the jigsaw (Aronson et al., 1978) and Group Investigation (Sharan and Hertz-Lazarowtiz, 1980), but it differs from the above in the wholeness-unitary

element of the content (same content to all group members and the self selection of the task for specialization.

After adult students learning Hebrew literature at an evening school were introduced to the "circle" and practiced for it for a few weeks, trained observers entered the classroom and coded their behavior. We used an elaborated schedule of 13 predetermined categories, to recode verbal group interaction. Each group was observed six times, for a period of 30 40 minutes

In a factor analysis of the observational data, based on frequencies of 13 categories of behaviors, six factors with .40 and more loading emerged. Four factors included behaviors unique to a cooperative context, and rare in other contexts. Those were named. Group Maintenance (2 behaviors: regulating toward cooperation, and social events) Integrative Summary (1 behavior, namely integrative summary). Cooperative learning (3 behaviors; agree with group members; give personal opinion, reaches a concensus). Giving information and Asking for help (these 2 behaviors). The additional two factors were named General Learning and Listening. The General factor included 3 behaviors (solitary on-task, giving explanation and off-task). The listening factor included 2 behaviors (on-task listening and social event).

In this context the unique cooperative behaviors increased dramatically From 10-15 percent (in non-cooperative context) to 40-50 percent. However general behaviors (non-interactive) were still very salient (over 50%). On the basis of the emerging factors, we concluded that even the cooperative learning context consists of solitary on-task behaviors in high frequency, and thus these behaviors are universal and general to all learning modes. The cooperative context is characterized by an increase in unique additional interactive cooperation behaviors. It seems that in order to combine the non-interactive and the cooperative-interactive behaviors, students develop a set of group regulation and

group maintenance behaviors. Interestingly enough, this set of behaviors integrates social and cognitive dimensions. Students regulate themselves to move from solitary to interactive modes of learning, by using specific transitional behaviors, and then they move to higher cooperative interaction, mainly in the form of exchanging ideas, seeking agreements, and reaching conclusions. The success of group depends on harmony and management of the transition, regulative, and cooperative functions that students must take upon themselves.

The correlation between the universal-general factor, which is non-interactive and the cooperative factor was significantly negative (-.52). This suggests that these behaviors can be viewed as distinct and different in their quality. *Both* of these types of behavior, however, are very frequent in the cooperative context of learning. In contrast, off-task interactive behaviors (social events) were very rare, implying that legitimization of interaction within the learning context reduces the need of students to interact outside of it.

A Summary of Studies that were conducted in the framework of the contextual model is attached.

Summary of Studies

Study: Hertz-Lazarowitz (1983).

Sample: Elementary school, USA. 450 subjects.

Context: Traditional instruction.

Indep. Variables: Age Grade 1-6.

Dep. Variables: Student behaviors; Cognitive level of interaction; Reasoning on helping.

Findings: No clear developmental trend. Half of behaviors non-interactive. Helping and cooperation rare. Low levels of cognition. Conflicting norms about help and cooperation in the classroom.

Study: Hertz-Lazarowitz (1984, Hebrew).

Sample: Elementary school Israel. Two 4th grade classroom (70).

Context: Learning centers.

Indep. Variables: Analayzing tasks in 3 dimensions: cognitive, social and structure (unitary, division, coordinate)

Dep. Variables: Teacher planned task activities vs student actual-task activities.

Findings: Students perform tasks by simplifying them. Student less complex activities in the 3 dimensions were planned by teachers' tasks.

Study: Hertz-Lazarowitz, Baird, Webb & Lazarowitz (1984).

Sample: High school USA, 30 classrooms.

Context: Traditional.

Indep. Variables: Subject matter. Instructional variation.

Dep. Variables: Student's behaviors Cognitive level of cooperation and help.

Findings: Subject matter (especially biology) and variation in instructional methods drastically effect interactive behaviors of student compared to other behaviors

Teacher centrality reduces interactive on-task behaviors and increases interactive off-task, while variation toward less centralization (laboratory) increase on-task interaction.

Cooperation and help are most sensitive to instructional variations compared to other behaviors.

Study: Hertz-Lazarowitz, Fuchs, Sharabany & Eisenberg (1989).

Sample: Elementary school. 65 students in 3rd grade.

Context: Traditional and active learning.

Ind. Variables: Socialization setting: (Kibbutz vs. city) Instructional mode.

Dep. variables: Prosocial reasoning, Student behavior, Cooperation and helping.

Findings: Students exhibit different behaviors in the two classroom context. In an active classroom, on-task behavior is more interactive and cooperative Instruction affects behavior more than socialization.

Study: Maskit (1986 Hebrew). Maskit & Hertz-Lazarowitz (1986). Hertz-Lazarowitz & Maskit (1989, Hebrew).

Sample: 93 adult students.

Context cooperative learning.

Indep. Variables: Group size, Sex group composition, time.

Dep. Variables: Factors of behavior. Attitudes toward and evaluation of cooperating learning.

Findings: Groups of three and five enhance more cooperative interaction, than groups of four. Groups with equal sex composition enhance most interactions.

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* See Fuchs, Eisenberg, Hertz-Lazarowitz & Sharabany (1986, in press), for the prosocial reasoning results

Three factors of behavior emerged. Universal-general: Unique cooperative interactive and group maintenance. Stability across time in behaviors observed.

Study: Maskit & Hertz- Lazarowitz (1989 Hebrew).

Sample: 93 adult students.

Context: Cooperative.

Indep. Variables: Experience in cooperative learning.

Dep. Variables: Attitudes and evaluations of cooperative learning.

Findings: Positive evaluation and attitudes related to factors of efficiency, and enjoyment of cooperative learning.

Study: Hertz-Lazarowitz (1989).

Sample: 752 students in Israel. Grades 3rd to 8th.

Context: traditional with variations.

Indep. Variables: task structure.

Dep. variables: Student behaviors. Cooperation and helping. Cognitive level of interaction.

Findings: Learning tasks that require engagement in a cooperative process (High-cooperation) produce interation of explanation. and elaboration which are on a high cognitive level. While Low-cooperative tasks. engagement in means or products, produce interaction only on the informative level Help interaction are mostly informative.

Study: Lazarowitz, Hertz- Lazarowitz, Baird & Bowlden, (1988)

Sample: 113 high school students, Learning Biology: Two units: cell and the plants.

Context: Individual mastery vs. jigsaw investigative.

Indep. Variables: Mode of instruction.

Dep. Variables: Academic achievement, On-task behavior. Retention of on-task behaviors over time.

Findings: Higher achievement for the jigsaw investigative group in the cell unit that required more inquiry activities. Higher achievement for the individual mastery in Plants unit which required more information learning. Increase and retention of on-task behavior for the jigsaw investigation method.

Study: Hertz-Lazarowitz (1989) Hertz-Lazarowitz & Calderon (1990).

Sample: 8 classrooms, El-Paso, Texas. 2nd and 4th grade, bilingual.

Context: Traditional.

Indep. variable: Observation of the six mirrors of the classroom.

Dep. variables: Student behavior and teacher behavior in transition from traditional to CIRC cooperative learning.

Findings: Most of the classrooms are organized to maximize isolation and non-interactive learning. Learning tasks are either collective or paper-pencil individual unitary tasks. Teachers' instruction; lecturing or assigning individual tasks. Teachers communication - mostly to whole class, and ping-pong with few students. Students' behavior; filling worksheets, passive listening, on-task non-interactive. Individual variation among teachers.

Study: Hertz-Lazarowitz & Shahar (1985 Hebrew), (1990).

Sample: 27 elementary school teachers traditional and cooperative instruction

Context: Traditional vs. Group investigation.

Indep. Variables: Instructional mode; Grade taught, Seniority, attitudes toward cooperative learning.

Dep. variables: Categories of teacher's verbal behavior.

Findings: Teacher changed significantly their verbal behavior; From formal and rigid in traditional instruction to informal and interactive in Group Investigation.

The classroom context of instruction explained more of the variance in teachers' behavior than seniority, grade and attitude.

Summary

Classroom instructional contexts as defined by the integrative model were studied to clarify the relationship between these dimensions and students' behaviors in their formal learning sequence. Table 3 in the appendix presents a summary of these studies. Students' behaviors are greatly affected by variations in these dimensions. As complexity is added to the classroom setting and the structure of the learning task, students' social skills and cognitive behavior becomes more complex. Similarly, a shift from expcsitory teaching to cooperative and active teaching also facilitates high level students' interactions.

Based on our studies, and the factors of behavior identified in Maskit (1986) we suggest that, once students are put in a complex learning context, they use the previously acquired universal non-interactive behaviors (in traditional contexts) and add unique behaviors for cooperative and interactive learning To be able to interact and cooperate, however, students need to acquire two meta-learning skills. We labelled those skills as the *transitional* skills needed to adapt to the shift from solitary to interactive behaviors, and *group maintenance* skills needed to keep the group on-task interactivity. Only after these two meta skills are acquired can students successfully engage in complex cognitive cooperative interaction Those were loaded on the cooperative factor and included helping, expressing ideas, reaching a concensus etc. The black box of cooperative learning includes all the behavior that student use in traditional non-interactive context. and the *addition* of unique behaviors.

Future research should study systematically the context in which the *unique* elements of interaction and cooperation take place. Without the study of all the mirrors in the classroom, and especially more research on the learning task (Bossert 1979), it is impossible to understand how and why students high level cognitions emerge and develop.

Finally, the model suggests a pathway to the development of a cooperative classroom. It does not exclude non-cooperative contexts of learning, those may be imbedded within the cooperative classrooms. However, learners and teachers have to be competent in moving from one context to another, flexible in their decision of how to structure different dimensions, and to become masters of matching the organization, task, instruction and communication to a particular set of goals, content and activity.

Thus, this view emphasizes the continuing open redesigning of classroom mirrors to warrant a development of a high quality cooperative classroom.

Table 1

Definitions and Examples of Students' Behaviors in the Classroom

(Six basic categories)

Behavior category	Description	Channels
On Task (solitary)	Pupil is engaged in the formal activity of the lesson (reads, writes, observes films, listens to teacher or student)	on-task/ non-interactive
Off Task	Pupil is engaged solitarily in an acitivity that is off task (reads a comic book, dreams)	off-task/ non-interactive
Social event	Pupil is engaged in verbal exchange unrelated to the learning activity (talks about a party or T.V. show)	off-task/ interactive
Cooperation	Pupil is on-task cooperating with a peer, in means, process, or product of learning (2 or more build a cell model from clay, 2 or more read and discuss a text)	on-task/ interactive
Helping	One pupil helps another pupil who asked for help with an on-task activity (shows him how to do an experiment, explain instructions)	on-task/ interactive
Teacher-student and interaction	Verbal interaction between teacher and student that is related to learning activity	on-task/ interactive

Table 2

Definitions and Examples of Cooperation and Helping

Behavior category	Description
Cooperation	
Low cooperation (simple) -	Cooperation in means (resources) or product, without cooperating in the process. Example: Students use common books, or other materials in their learning activity. Or they work individually on a task and then technically combine their products.
High cooperation (complex) -	Cooperation in the process of activity. Usually cooperating in a long-term process to create a cooperative product. Example: Students are engaged in a temporally extended process of working together, such as building a clay model of a cell, where planning and executing the model was carried out in a constant interactive manner.
Helping	
Student initiated -	Help is performed as result of a voluntary act of the student-helper, or as a response to a request from a peer.
Teacher initiated -	Help is imposed by the teacher, or by the task instruction.
Cognitive Characteristics	
Informative -	Exchange of information between pupils (related to "what"?)
Applicative -	Extending information to application, such as solving the problem, performing an experiment, giving broader examples (related to "how"?)
Evaluative -	Making generalization, judgments, creating a new solution, examining current data (related to "why"?)

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