

Complex Instruction:

Equity in Cooperative Learning Classrooms

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Many educators view cooperative learning as an alternative to tracking and ability grouping and as an appropriate and promising strategy for academically and linguistically heterogeneous classrooms. When students work in small groups, they talk and work together and serve as resources for one another. Students who do not read at grade level or who are not proficient in the language of instruction gain greater access to understanding the assignment and therefore have more opportunities to participate in the group's interactions. However, cooperative learning also poses a serious instructional dilemma when it creates situations in which students who are academically low achieving or who are social isolates are excluded from the interactions. Thus, rather than increasing equity, cooperative learning also has the potential to reinforce a severe educational and social problem.

In this paper, we focus on two dimensions of equity when considering student learning in small groups: access and equitable relations. First we ask: Do students who do not read at grade level or who are not proficient in the language of instruction have opportunities to use the instructional materials and complete the group activities? Do other group members prevent them from examining, or manipulating these materials? Second, we ask: How can the teacher ensure that all group members are active and influential participants and that their opinions matter to their fellow-students?

Complex Instruction (CI) is an instructional approach that allows educators to address these questions successfully. In CI, teachers use cooperative groupwork to teach at a high academic level in diverse classrooms. They assign open-ended, interdependent group tasks and organize the classroom to maximize student interaction. In their small groups, students serve as academic and linguistic resources for one another. When implementing CI, teachers pay particular attention to unequal participation of students and employ strategies to address such status problems. The theoretical and empirical knowledge base of complex instruction is the result

of many years of programmatic research in heterogeneous classrooms at the elementary and at the middle school levels (See Cohen & Lotan, 1997).

Complex Instruction in Action1[1]

“Immigration - many of us know about it first hand,” says Ms. Garcia. “Yesterday, Victor spoke about his parents who immigrated to the US from Mexico. After living in a refugee camp in Thailand for two years, Kim’s family immigrated here from Vietnam. Almost everyone in this classroom has family or friends who have moved from one country to another. Families or individuals have different reasons for moving, and they all have a different story to tell.”

The group of seventh graders at Yosemite Middle School in California’s Central Valley is listening attentively. Ms. Garcia is talking about something close to their own experiences. “Why *do* people move?” she continues. “Studying the movement of people and the reasons behind it is central to the study of history. We will explore this question in the unit^{2[2]} we begin today. Group One will listen to *corridos* to understand why some people moved here from Mexico. Listen carefully to the songs and the lyrics and discuss the questions on your activity card. When you write your own song, make sure you include the emotions people might feel when they decide to leave their home countries. Group Four will analyze the drawings made by children who witnessed the war in El Salvador. What colors are the children using and why? What is the message of these drawings? The group with the task about Guatemala, be particularly careful with that beautiful *huipil*. I borrowed it from a friend. Look at the patterns and the designs. Think about what they might express.”

The students seem anxious to start. But Ms. Garcia wants to keep them focused for just a few more moments: You need to organize yourselves and be productive. During the wrap-up, you will present your products and explain them to the class. Let me remind you that for these activities you need many different abilities. You will read, write, and draw. You need to be able to analyze visuals and interpret songs. Finally, you will need to be creative and have the ability to visualize and build a three dimensional sculpture. Remember: No

one of us has all these abilities, but each one of us has some of the abilities we will use today. Listen carefully to one another; you all are important resources for your group. You have thirty five minutes. Check the role chart. You know what to do.”

On this cue, the students turn to each other and begin to organize themselves. After checking the role chart, they put on their role badges. The *Materials Managers* scurry about the classroom, picking up folders containing the activity card and the resource materials: audio tapes, colorful photos, maps or charts. They grab some stuff from the "materials area": markers, scissors, glue, colored paper, yarn, and other interesting looking items.

As they settle into examining their materials, students focus on the reasons for immigration to the US from a particular Latin American country. They discuss how political persecution, economic hardship, personal ambitions, and professional opportunities result in decisions to emigrate. They also consider the heavy costs of moving: breaking up families, leaving the only home people have ever known, and having to adjust to a new place.

In the group by the window, two boys and two girls listen intently to a *corrido*, a Mexican folk song. Swaying to the music and tapping their fingers, they follow the lyrics of the song, printed on the resource card.

"This guy sure got around. Traveled to lots of places all over the country. It must have been fun, " says Carolina.

"I'd rather stay home and not have to wash dishes all day," Hector remarks.

Later, the students negotiate what details to include in their group project, a song reflecting why some Mexicans would move to the US.

"Let's use a tune we all know," suggests Veronica.

"O.K., but what will the song be about?" asks Hector. The group members fall silent for a moment. Carolina, *Recorder* for the day, takes out a piece of paper and a pencil.

"Why don't we use some of the ideas from the song we heard," Carolina suggests. "How about if we make it about Jose, who wants to come to Hollywood to be a movie star?" Veronica and Hector nod their heads in agreement. Victor, the fourth member of the group, shrugs his shoulder, looks away, and, as usual, mumbles

something quietly. "I'm sure this guy didn't have too much fun. Sounds to me like he worked really hard. He fixed the rails and picked tomatoes and mixed cement. For only fifty cents an hour! I'd be tired and disappointed." Carolina begins to write what she has decided will be the first line of their song. Ms. Garcia, who has been watching the group from a discreet distance, interjects:

"Victor," she says, "You listened to the song carefully and you clearly understood the deep message of the lyrics. This is important information for your group. What do you think your group's song should be about?"

"I'm not sure," Victor answers hesitantly, "I just know that my family didn't come here because they wanted to be movie stars. They came because there were no jobs in Mexico. My father says he wanted to work so we could have a better life. "

"Maybe we can put these ideas in our song." Veronica is ready to compromise. As they offer examples of how they might do this, Ms. Garcia moves away, now reassured that Victor's contribution will be heard by his group.

In the group across the room, Michael reads a letter out loud to the others. The letter is from a father to his son, a Salvadorian refugee, who managed to escape to the US. As they listen to the somber account of armed soldiers storming a house, they examine children's drawings included in the activity. Michael, the *Facilitator*, paraphrases the question on the activity card: "What do you see in these drawings and how do they make you feel?"

"They make me feel sad," says Jennifer. "These children saw horrible things happen to their families and their friends."

"Yeah," agrees Alma, "Look at how they drew pictures of the soldiers murdering everyone, even little kids. It makes me feel bad. And angry. But I am also glad some people got away."

"But they drew pretty flowers and trees too," Sui Li adds, "That shows how much they loved their homes even though the war was destroying them."

By this time, members of the group in the front of the classroom have read about the extreme poverty and political strife in Haiti and about the Tonton Macoutes. The students are getting ready to work on their group product: a tap-tap bus, decorated with a message about reasons for leaving Haiti. Sergio and Manuel cut

out the bottom of paper cups to make the wheels, and Maria and Devon carefully cover a shoe box with white paper.

"Let's not forget to show how the Tonton Macoutes are beating people," Manuel reminds his group.

Ms. Garcia is pleased as she looks over her classroom. The students are talking and working together; they are engaged and interested. They all make an effort to understand and contribute to their group's product. For their homework assignment, students will complete the individual reports and write about the discussion in their groups. Tomorrow and the next day the groups rotate so that each group will get to do two more tasks. Ms. Garcia is looking forward to her students writing thoughtful essays and clearly answering the questions on next week's test.

Achievement Results in Complex Instruction Classrooms

What do students learn in a setting like the one just described? Cohen et al. (Cohen and Lotan, 1997, Chapter 10) present a detailed summary of student achievement in CI. They report results from two data sets collected in social studies classrooms (from 356 seventh graders and 344 eighth graders), in five middle schools in the San Francisco Bay Area, between 1991 and 1993. These data include test results from classrooms that used curricula specially designed for CI and aligned with the California social studies framework as well as test results from comparison classrooms where teachers did not use CI but covered the same topics.

The tests reflected the academic content of the units. They contained factual items and analogies which used simple language but required abstract thinking. For example, one question from the unit called "How Do Historians Know about the Crusades?" is:

The way the Muslims felt after the Crusaders captured Jerusalem was like the way you would feel after
a. winning the lottery; b. not getting invited to a party; c. catching a cold; d. having your home robbed of all its valuables.

Students in the CI classes gained significantly more than students in comparison classes on questions requiring higher-order thinking, as in the example above. Students in CI and comparison classrooms did not differ on items requiring factual recall.

We found that the different ways in which teachers implemented the program were powerful predictors of posttest scores. For example, the number of activities and individual reports that students completed had a favorable effect on the post-test scores. Furthermore, management problems in some classrooms interfered with learning gains. From this we concluded that it is necessary for teachers to give students time to experience all of the activities of a unit and that severe management problems should be addressed.

These results replicate findings from the elementary school. For example, in elementary schools classrooms, students who had experienced a bilingual mathematics and science curriculum (Finding Out/ Descubrimiento) improved their scores on the Comprehensive Test of Basic Skills (CTBS) as much as 25 percentiles. Gains averaged approximately 20 percentiles across the three mathematics subscales: computation, application, and total math. Students with lower pretest scores and bilingual students showed excellent gains as did gifted students and those from magnet schools.

Group Tasks for Complex Instruction

To foster conceptual understanding of content material, the group activities of a complex instruction unit are *organized around a central concept or a big idea of the discipline*. Students encounter this concept or idea in different contexts, and thus have multiple opportunities to grapple with the material. For instance, students in Ms. Garcia's class rotated through different group activities each addressing the complexities of human migration: not only economic hardship, and political persecution, but also the potential for a better life, and hope for the future. Student learning went well beyond the facts and dates of modern migration; indeed, students learned how a combination of factors shape people's experiences and lead them to move, or to stay. Studying this question in the context of migration from Latin America, prepares students both to ask and to respond thoughtfully to similar issues wherever they encounter them.

CI learning tasks are *inherently uncertain and open-ended* both in their solution and in the process by which students arrive at that solution. Students discuss issues that are open to interpretation, that have no one right answer, and their discussion decides the direction of their group product. The task on Haiti used in Ms. Garcia's class has a virtually unlimited number of legitimate "messages" for the students to express with their

tap-tap bus. In each activity, the groups not only decide what to include, but also how to structure their product to best reflect their country.

Open-ended and inherently uncertain tasks increase the need for interaction since they force students to draw upon each other's expertise and repertoire of problem-solving strategies. Given the intellectual heterogeneity of the students in the group, these repertoires are rich and varied. Teachers encourage students to explore alternative solutions, to communicate their thoughts effectively, to justify their arguments, and to examine issues from different perspectives. These are the processes that contribute to the development of higher-order thinking.

All of the hustle and bustle of a class engaged in group work increases the need for students to *depend on each other*. Students must discuss complex content material, design and prepare their group product, report to the class, and teach others what they have learned --- all within a very short time period. They *must* depend on one another to get the job done. Additionally, students who do not understand English depend on bilingual group members while students who cannot comprehend the activity card or resource cards depend on others for assistance. Students learn that they have the duty to assist those who ask for help. While the tasks are interdependent, students are also held *accountable individually*. They must complete an individual report about their work in the group.

Multiple-ability tasks are a necessary condition for teachers to be able to convince their students that there are different ways to be "smart." Students who do not excel at paper-pencil tasks often do excel when academic content is presented in different ways. Tasks that require multiple abilities give teachers the opportunity to give credit to such students for their academic and intellectual accomplishments. For example, students examine texts, drawings, artifacts, cartoons, music and art to make sense of events. The task with the Mexican *corridos* requires different intellectual abilities: creating melodies and rhythmic patterns, and analyzing the relationships between a song's melody, lyrics, mood, and purpose. Other activities require understanding sophisticated texts, detecting sources of bias, empathizing, relating a single textual passage to a larger scheme of events, and translating the message of a text into nonverbal forms.

Status Problems and Treatment

The open-ended and uncertain nature of the curriculum, and the incorporation of multiple ability and interdependent group tasks will not, by themselves, provide access and equitable relations for all students. Some students come to the tasks with higher status than others; these students talk more and, as a result, learn more (See Cohen & Lotan, 1997, Chapter 5). This is an instructional dilemma inherent in groupwork, a problem rooted in the students' perceptions of themselves and others.

Expectation states theory (Berger, Cohen, & Zelditch, 1972) describes how status characteristics come to affect interaction and influence in group situations. A status characteristic is an agreed-upon social ranking where everyone feels that it is better to have a high rank than a low rank. Status characteristics may be diffuse, based upon general social distinctions such as race and gender; or they may be specific, based upon perceived ability relevant to a specific task, such as reading ability. In addition to diffuse and specific status characteristics, local status characteristics such as peer and academic status have a powerful effect on interaction in the classroom (Cohen & Lotan, 1997, Chapter 5). Contrary to common assumptions, the power of peer and academic status means that students of color are not necessarily the low-status students.

According to the theory, status characteristics become the basis for the group's expectations for competence for its members: low expectations for low-status students, and high expectations for high-status students. These expectations for competence are held by teachers, by classmates and by the students themselves. Students who lack traditional academic skills or proficiency in the language of instruction or who are social isolates, are often perceived as low-status students. They barely participate, are often ignored, and frequently are not given a share of the materials or a turn at the activity. Students who are expected to be good at school or are popular talk more, have greater access to materials, and are more influential in group discussions. These behaviors are all indicators of status problems (Cohen, 1994).

In the vignette above, Victor is an example of a low-status group member. Because no one expected him to be competent, the group members did not ask his opinion or try to find out what he said. Thus, without Ms. Garcia's intervention, the result would have been a self-fulfilling prophecy: His initial low status would have resulted in the group's perceiving him as incompetent on the task.

Status problems can lead to learning problems. Research has shown that the rate of interaction in the group is a strong predictor of learning gains (Cohen, Lotan & Leechor, 1989). As high status students interact more in the group, they learn more from the task; as low-status students interact less, they in turn learn less (Cohen, 1984). Paradoxically, in cooperative learning designed to promote equity, unless the teacher intervenes to equalize rates of participation, the rich get richer, and the gap in academic achievement widens. Complex instruction offers two strategies to treat status problems in the classroom: (a) the multiple-abilities treatment and (b) assigning competence to low-status students.

The Multiple-Abilities Treatment

One way to minimize the problem of unequal access and learning for low-status students is to broaden the conception of what it means to be “smart.” The multiple-abilities treatment is grounded in the teacher’s public recognition of a wealth of intellectual abilities that are relevant and valued in the classroom and in daily life.

Recall how Ms. Garcia talked about the different abilities needed in her classroom. She reminded students of the many types of abilities that would have a direct impact on the quality of their products. She set the stage for showing her students, with concrete examples based on their own accomplishments, that there are many ways to excel in the classroom.

Rather than assuming that all students can be ranked along a single dimension of intelligence, the multiple abilities treatment highlights specific skills and abilities that students need for their particular tasks. Each student will have different strengths and weaknesses among these multiple abilities. For example, the highly verbal student may have difficulty with tasks that require spatial and visual competence. Likewise, the student who scores poorly on a vocabulary test may be an astute scientific observer. This view of ability is compatible with work in psychology that suggests intelligence is multidimensional (Gardner, 1983; Sternberg, 1985).

A multiple-abilities treatment typically occurs during orientation to the day’s work in groups. Like other CI teachers, Ms. Garcia starts by naming the different skills and abilities necessary for successful completion of

an activity and then explains the relevance of these abilities to the task. An effective multiple-abilities treatment convinces students that the task in which they are about to engage is fundamentally different from traditional classroom tasks because it relies on many different kinds of intellectual abilities.

The next step in the treatment is to create a mixed set of expectations for each student. It is essential that each student perceives that he or she will be strong on some of the abilities and weaker on others. Ms Garcia created a mixed set of expectations when she said explicitly: “Remember: No one of us has all these abilities, but each one of us has some of the abilities we will need today. Listen carefully to one another; you all are important resources for your group.” This step cannot be omitted in a successful treatment. Herein lies a central premise of complex instruction: Each individual brings valuable and different abilities to the task. All contributions are needed for success.

Assigning Competence to Low-Status Students

Unfortunately, the status order in the classroom is deeply ingrained. While research has shown that a multiple abilities orientation can help to equalize interaction between high- and low-status students (Cohen, Lotan, & Catanzarite, 1988), a second treatment shows even stronger potential to boost the participation of low-status students.

Assigning competence is a *public statement* that specifically recognizes the intellectual contribution a student has made to the group task. Teachers can assign competence to any student but it is especially important and effective to focus attention on low-status students.

Assigning competence is a *positive evaluation*. It relies on the teacher’s power as a legitimate source of evaluation as students are likely to believe the teacher’s opinion. To change not only the student’s expectations for competence, but also to raise the group’s expectations for that student, competence must be assigned publicly, so that both the student and the classmates hear it. Thus when Ms. Garcia intervened in Victor's group, she specifically pointed out his expertise. Assigning competence must be specific so that the student and the group know exactly what he or she did well. Finally, it must make the intellectual ability demonstrated by the student *relevant* to the work of the group.

Cohen & Lotan (1997, Chapter 6) review evidence for the effectiveness of status treatments in the elementary and middle school classroom. In a study of 13 elementary schools, Cohen and Lotan found that status interventions boosted the participation of low-status students, while not suppressing the contributions of high-status students. These positive effects occurred despite the low overall frequency of teacher's use of status treatments.

In the middle school, it was much more difficult to measure the effect of interventions. At this level, status differences present a more complicated scenario. Students develop their own sources of status such as peer popularity that may be quite independent of academic status. This complexity made it difficult to measure the effects of teachers' treatments independent of the severity of status problems that existed before the teacher intervened.

Conclusion

Creating equitable classrooms is imperative, though no easy task. We have found that it requires changing the organization of the classroom, the roles of teacher and student, and the nature of the curriculum. Above and beyond these far-reaching changes, an equitable classroom requires deliberate interventions to produce equal-status relationships within the groups. Failing this last step will mean that some students will not have equal access to learning. Current rhetoric speaks of schools where all students can learn. Complex instruction tries to make those words a reality.

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