Beyond Cooperative Learning

Building a Learning Community

BY KEVIN CARR

One characteristic of the 1990s is a longing for community. People live together in neighborhoods and work together at jobs, but lack the deeper values of caring for one another. Various changes in society have created conditions that make caring, functioning communities rare, indeed.[1]

As Christians, we are described as "the salt of the earth,"[2] which means that we are to enhance the lives around us. Part of the unique mandate for "salty" Christian schools is that they build and nurture a biblical community within a quality academic environment.

How are we doing? Too often we have succumbed to many of the same pressures that plague society in general. The realities of effectively marketing an SDA school dictate that we must provide high quality, competitive academic programs. All too often, the push to attain higher academic achievement creates a rushed classroom environment where little meaningful personal interaction takes place.

As a result, many Christian educators feel a conflict. Commitment to academic excellence seems to compete with the time necessary to create a need-meeting environment. Cooperative learning offers a solution to this dilemma by stressing meaningful interaction and community building as integral to the learning process. Properly applied, cooperative learning builds community as part of a comprehensive, academic classroom environment. By making community-building the model for academic programs, we can not only transform our classes, but also ourselves as teachers.

Defining Community

Community is a hard ideal to define. Luke, in Acts 2:42-47 (NASV) gives a snapshot of the early Christian community:

And they were continually devoting themselves to the apostles, teaching and to fellowship, to the breaking of bread and to prayer. And everyone kept feeling a sense of awe; and many wonders and signs were taking place through the apostles. And all those who had believed were together, and had all things in common; and they began selling their property and possessions, and were sharing them with all, as anyone might have need. And day by day continuing with one mind in the temple, and breaking bread from house to house, they were taking their meals together with gladness and sincerity of heart, praising God, and having favor with all the people. And the Lord was adding to their number day by day those who were being saved.[3]

The early Christian community was an exciting place where serious learning and social interaction were successfully blended. As a result, personal transformation was an expected result of the "curriculum." The community of believers certainly met the needs of its members. William Glasser, popular educational reformer and author of *Control Theory in the Classroom*, explains that we are endowed with five fundamental needs: survival, belonging, power of self-efficacy, freedom, and fun.[4] In Glasser's model, meeting these needs may be likened to an internal goal, which, when met, leads to satisfaction and quality. Glasser's model can be applied to Luke's account of the early church:

Need	Christian Community
Survival	". . .sharing them with all, as anyone might have need. . ."
Belonging	". . .and all those who had believed were together, and had all things in common. . ."
Power/Self-Efficacy	". . .and having favor with all the people. . ."
Freedom	". . .and they began selling their property and possessions. . ."
Fun	". . .they were taking their meals together with gladness and sincerity of heart. . ."

The early church was devoted to learning: ". . .and they were continually devoted to the apostles' teaching and to prayer. . . ."

The early Christian church may be thought of as a learning community, a culture structured to facilitate transformational learning and growth through the meeting of core needs. Similarly, cooperative learning seeks to create a powerfully collaborative classroom culture, an ideal that is often overlooked amid the focus on specific methods. When we speak of teaching "social skills" through cooperative techniques, we are actually getting at the heart of what cooperative learning is all about. Cooperative learning asks us to make building community not just another learning objective, but *a core value of academic excellence.*

Cooperative Learning, Apprenticeship, and Authentic Activity

Researchers have suggested that bringing about the sort of learning community described above may require fundamental changes in the standard way of viewing teaching and learning. According to Liana Graves, nothing short of a complete paradigm shift is involved.[5] One fact seems clear: Cooperative learning, if used as another in a long list of "reforms" meant to add to teaching's "bag of tricks," will not bring about the exciting and quality learning community we desire.[6] We must become serious about thoroughly revising our teaching beliefs, curriculum, and possibly even ourselves as teachers to meet the goal of creating academic community in our classes.

The cooperative learning jingle, "Be a Guide at the Side, Not a Sage on a Stage," succinctly describes the comparison between two metaphors of teaching (see Figure 1). The "Sage on a Stage" image illustrates the *conduit* model of teaching and learning in which knowledge is transmitted from the omniscient teacher to the

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passive student who more or less absorbs information like a sponge. Researchers see the conduit metaphor as inadequate.[7] Rather, the nature of knowledge requires

negotiation. It is a dynamic social interaction between teacher and learner, with both parties taking an active role. New knowledge is actively constructed by the learner, producing a new mental and emotional structure. A "Guide at the Side" sees his or her purpose as collaboration with each student in the process of constructing knowledge and meaning.

Researchers speak of *cognitive apprenticeship* as an appropriate metaphor for teaching and learning. According to Brown, Collins, and Duguid, learning may be seen as a process similar to that of craft apprenticeship.[8] While learning a craft, an apprentice is under the guidance of a master, *modeling* the knowledge, process, and results of the craft. Slowly, the young person is given the freedom to attempt the craft, with the master *coaching* and guiding as needed. As mastery is gained, the apprentice is encouraged to work more independently, and the master *fades*. Not only has the apprentice gained knowledge about the craft, but he or she is also a functioning craftsman. Cognitive apprenticeship means involving students as "academic craftsmen," persons learning to engage in the *authentic* activity of the discipline being studied.

Learning a craft involves gaining experience in using the tools, language, processes, and evaluative criteria of a master craftsman. Cognitive apprenticeship involves a similar immersion in the discipline being taught. For example, most would agree that the most effective way of learning a foreign language is to become immersed in foreign culture. Some schools even have language immersion programs that attempt to simulate a foreign environment on campus. Such an

environment constitutes "authentic activity," with learning taking place as "real life." Researchers are increasingly convinced that authentic activity is the key to promoting meaningful and active learning.[9]

What does an academically authentic class look like? In a science class, students are asked to learn to be scientists. They form a community of "apprentices," with the teacher acting as master scientist. As he or she models the scientific process, the teacher slowly enculturates the students into the knowledge, language, processes, and outcomes of the scientific craft. Gradually, the apprentices are encouraged to function more independently, as they practice the strategies previously modeled. The aim of the learning experience is to produce students who have internalized scientific knowledge and become part of a scientific culture as reproduced in the classroom.

The difference between inauthentic learning and contextually rich, authentic learning may be illustrated by the way we ask students to acquire content knowledge. For example, Newton's three laws of motion are basic content knowledge for any physics course. We usually ask students to memorize these laws, and later test them on their content. This approach, ironically, gives the illusion of knowledge, but does little to promote understanding of Newton or his "craft." Instead, students may be asked to learn something about Isaac Newton in a historical context. They then see that Newton's studies were driven by a deeply religious desire to better understand the work of the Creator and that his three laws were formulated during a period of solitary exile made necessary by an outbreak of the Great Plague in England. With the contextual foundation laid, students may now collaboratively research and carry out experiments as scientists. As they internalize Newton's science more fully, many students will be able to create their own investigations and gain deeper understanding.

This brings into focus the purpose of cooperative learning, which is to prepare students to function in a thoroughly collaborative world. In authentic education, collaboration is mandatory because learning in the "real world" outside of school is a cooperative venture. For instance, scientists are a highly collaborative community of learners. However, for collaboration to flourish, friendship, trust, and caring must be present. In other words, community must be built and nurtured in our classrooms. Cooperative learning, if properly implemented, offers the promise of producing high quality academic learning communities.

Structure of a Learning Community: An Example[10]

I teach in an SDA day academy with an enrollment of approximately 230 students. Our physics class has varied from 15 to 30 students over the past several years. The course is designed to accommodate a wide range of entry-level ability, although most students are college bound with some interest in the sciences. I currently have two sections of physics with between 7 and 15 students per section. Each class period begins with prayer and a "debriefing," when students may discuss whatever is on their minds. Typically, this takes only a short time, but on occasion there is something significant to discuss, and we take time for this. I find that it is time well spent both in terms of building community and creating a climate in

Figure One: Comparing the Conduit Model With Cognitive Apprenticeship

Classroom Dimension	"Conduit" Model	Cognitive Apprenticeship
Knowledge and content	Mostly fixed, prescribed	Process of creation
Learning	Transmission by teacher, assimilated by student	Discovery by group, negotiated as a community
Role of teacher	Authority, source of knowledge	Master craftsperson, collaborator
Role of student	Laborer	Apprentice
Class structure	Students mostly work alone	Groups of various sizes working together as well as alone
Goals and outcomes	Prescribed by teacher	Collaborative, owned by all
Priority and focus	Covering material	Immersion in culture
	Remembering answers	Competency in culture
Cooperative learning	Included as special or occasional method of teaching information	Authentic activity

which students are prepared to focus on the academic task at hand.

At the beginning of each unit of study, students receive an outline of expected outcomes. These typically include (1) a set of "think and explain" questions, which aid the student in internalizing basic physics concepts as presented by the textbook and in lectures and demonstration; (2) a take-home type exam; and (3) a research report or paper in which the students engage in a collaborative scientific process. In terms of time allotment, large blocks of time are devoted to research projects, during which the students participate in cooperative learning, collaboration, and cognitive apprenticeship. At the end of each unit, each student submits and displays a portfolio based on his or her study. Each student includes in the portfolio a written summary of what was learned in which he or she reflects on the experience.

Students are occasionally given the opportunity to share learning experiences with the class. Finally, exemplary research and other work is compiled in an in-house publication, *PAA Physics*, copies of which are shared with the school principal and board members, and put with the periodicals in the school library for general circulation. Final portfolio evaluation takes the form of a narrative response, as well as a point total.

Two Examples of the Learning Community Model
Example 1: Ancient Science

I begin the year by introducing students to collaborative scientific processes. Physicists ask some of the most basic questions about our world. To the ancients, the motion and placement of the heavenly bodies was a question of great importance. For instance, the moon and sun appear about the same size in the sky. How can we show that the sun is actually much larger and farther away? The ancient Greeks were able to accomplish this by using simple tools that can be

Properly applied, cooperative learning builds community as part of a comprehensive, academic classroom environment.

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made by students. I arrange the students in research groups of three to four each and we begin, as a community, to work on the problem of mapping the solar system.

We assume a heliocentric model (the sun in the center with the earth revolving around it, and the moon in turn revolving about the earth). This assumption was, of course, not generally held by the ancient Greeks and lends itself to a fascinating discussion on the fact that scientists often must begin with an unproven assumption to make progress. The sizes and distances of the sun/earth/moon system may be constructed from three pieces of information:

1. The total time of an average solar

eclipse. This was known to the ancients and can be used to derive the relative sizes of the earth and moon.

2. The angle between the sun, earth, and moon at exactly half-moon. This experiment was first carried out by Aristarchus of Samos and is used to find the relative distances between the earth, moon, and sun. We use the method of Aristarchus to find the distance to an object near our school—a security camera on top of a nearby hospital—using short measurements and angular sightings in the yard outside our classroom.

3. The circumference of the earth. This was first measured by Erastosthenes of Cyrene by measuring the angle made by the sun at noon (in Alexandria, Egypt) at the exact moment it was directly overhead at a location some known distance south (Cyrene). By drawing a picture of the known angles and distance, one can calculate the circumference of the earth with some accuracy. We reproduced Erastosthenes' experiment exactly, except that we used friends in Roseburg, Oregon (located nearly directly south of Portland), as our "Cyrene."

The process of discovering the facts needed to solve the problem makes obvi-

ous the need for cooperation and collaboration. It is also authentic in that the scientific process, with its elements of trial and error, is being used to discover knowledge. Groups work together to research the three experiments in books (keeping a journal of their findings, as well as the findings of others), working through the trial-and-error process of building devices capable of measuring very small angles and of measuring the incident angle of the sun, and writing up results and conclu-

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sions for the research. When given an authentic scientific problem that requires collaboration, the students begin to build academic community naturally.

Students immediately observe that each group arrives at different answers through different means. "Who is right?" is a popular question. At this point, we engage in a process similar to the well-known "jigsaw" activity. After discussing the concept of experimental error, I have the students report their findings as a range within which they are absolutely certain the real answer lies; for example, the circumference of the earth may be guaranteed to be between 23,000 and 28,000 miles by the groups' calculations.

Every group reports its range, which is charted on a graph, showing where the most statistical "overlap" occurs between groups. Then we can state that we are, collectively, very certain that the answer lies in this smaller area. This whole process can be done with no advanced math, although some students recognize (to my pleasure) that they can apply trigonometry and statistics to the problem. All information is similarly analyzed, and the whole puzzle is put together. By now, most students are excited and enthusiastic about physics and are beginning to see themselves in a more active, collaborative role.

After all of the pieces of knowledge are put together to form a model of the solar system, we discuss our successes and failings, and we all feel impressed with the accuracy and precision of the ancient Greeks. But even more important is how the activity bonds the students (and teacher) together through collaboration, individual accountability, group ownership in outcomes, and the general feeling of having accomplished something authentic as a group.

Example 2: The Relationship Between Art and Physics

Once the class has been established as a functioning learning community and has increased in competence, I begin to act more as coach and fellow researcher. This is the most exciting part of the year for me, because I also become a fellow learner. This past year, one of my physics groups decided to collaborate on a project involving physics and art as the final activity for an extensive unit on the physics of sound and music. The process that emerged was as follows:

1. *We established the overall goal* of showing the relationship between art and physics. Some students were enrolled in art as well as physics, and were excited by the possibility of integrating subject matter.

2. *Extensive group brainstorming* occurred among the class as a whole. We converged on an idea suggested by a

demonstration that had been done in class involving vibrating metal plates and their nodal patterns (Chladni plates). At this point, I felt concerned because I didn't know whether this had ever been explored as art.

3. *The students conducted research* during a field trip to a local university science library. Each student was held responsible for using library resources (computers, library personnel) and of finding at least one research source on the topic of Chladni plates. Learning to use an academic library was a tremendous experience for the students. As I suspected, this had not been done as art before, at least not that we found.

4. *We brainstormed methods* of creating art with Chladni plates, using the background research as a basis. We agreed that each student would design and fabricate his or her own Chladni plate(s) out of sheet metal, and devise a way to preserve the nodal patterns produced.

5. *Using the art department as a lab,* we designed, made, tested, retested, and produced artistic designs using Chladni plates. It was great fun, and many observations and mini-discoveries occurred in the process of experimenting.

6. *Each student wrote a research paper* on the above experiment and process. We displayed the plates and designs at our spring science fair. Further evaluation occurred during a summary of the learning, which afforded each student an opportunity to reflect on his or her learning.

The apprentices had come a long way. In fact, they functioned authentically as scientists, creating and adding to knowledge in a meaningful way. In addition, the teacher learned a great deal about physics, art, and being a "guide at the side."

Observations

Researchers note that teachers tend to resist implementing cooperative learning. Utilizing the apprenticeship model and teaching collaboratively in a learning community involves reflection on, and possible revision of, core beliefs about teaching. Alfie Kohn, in *Resistance to Cooperative Learning,*[11] makes some observations that seem especially relevant to those interested in building a learning community.

1. *Building community reduces con-*

trol and predictability in the classroom. Kohn says that the traditional model of teaching "amounts to a solo performance by the teacher, whereas cooperative learning amounts to handing everyone an instrument and inviting improvisation." For those (myself included) trained mostly as "direct instruction" teachers, a highly controlled classroom environment, based on the "conduit" model, has been painted as the ideal. Learning apprenticeship demands collaboration and negotiation on classroom management issues that we usually see as fixed. For example, the specific content taught may have to be adjusted to fit the needs of each year's students. Discussion on a given topic may require only 10 minutes with a particular group of students, but lead to weeks of study and research with another, depending on individual interests and needs. Even more unnerving is the process of allowing students to become academic craftsmen themselves, with the freedom to create and grow in their own directions. Yet research clearly shows that students gain more self-confidence, autonomy, and academic independence and excellence when allowed to do this.[12]

2. *Students may resist cooperative learning.* Students have their own, similar reasons for resisting cooperative learning. Some students would rather remain as "laborers" who simply "get their work done." Many resist learning and would rather be fed answers "conduit" style by a teacher authority. Often, the highest achieving students come with a strong belief in the "conduit model." Why? Because using it, they have learned to be highly successful. Often it is my more "average" students who respond the most positively to collaborative apprenticeship learning at the outset. Therefore, the teacher can expect resistance, and must see the building of classroom community as a long-term process in which students are allowed to express their discomfort openly. Community must be encouraged through attraction, not coercion.

3. *Learning communities require time.* Trial and error, open-ended discussions,

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talking, reflection, and student-designed projects are integral parts of the apprenticeship process. By allowing these activities to take place, we may have to reduce the amount of pure content taught to achieve benefits of spending the additional time that collaboration requires. Cutting content is a reality that seems distressing, or liberating, depending on your perspective. It is certainly an important issue to consider.

Conclusion

Cooperative learning is more than a just another method of teaching content. It defines the whole learning process in terms of building social, academic, and social community. Cooperative learning is about creating comprehensive, need-meeting environments in our classrooms, where authentic learning apprenticeships

take place. Summed up, it is *education with integrity.* It prepares students for the world as it actually is, a place where people are accountable not only for individual results, but also to others. It means a commitment to learning meaningfully and constructively, decreasing the tendency to spend time with busy work, or what William Glasser calls "junk knowledge."[13] Most of all, authentic learning in a functioning community *feels good,* is motivating, and produces academic and relational excellence as desired by parents, deserved by students, and prayed for by teachers. ✍

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