**MAKING THE CASE FOR** collaborative learning seems almost too easy. More

research on learning in small groups exists than on any other instructional

method, including lecturing (Johnson, Johnson, & Smith, 1991; Slavin,

1989–90). While most of this is credible and positive, it is dominated by

research and investigation in K–12, and higher education is coming late to

the scene.

Exploding research on cognition and the brain confirms so much of

what we have learned about the effectiveness of peer interaction in promoting

active learning that college teachers need not fear that experimenting

with collaborative learning in their classrooms will plunge them into

uncharted territory. Unlike much research in higher education that is often

reported in unrelated studies, scholars studying collaborative learning have

mapped the terrain and conducted helpful meta-analyses that synthesize

findings across topics and institutions.

The purpose of this introduction to the extensive literature on interactive

group learning is to glean from experience and research information

that is useful to college teachers in deciding whether collaborative learning

will be effective in accomplishing their teaching goals. Specifically, this

introduction addresses the following questions:

• What do we mean by *collaborative learning?*

• What is the difference between collaborative learning and cooperative

learning?

• What are the defining characteristics of effective learning groups?

• What is the pedagogical rationale for collaborative learning?

• What is the evidence that collaborative learning promotes and improves

learning?

**The Case for**

**Collaborative Learning**

**Chapter 1**

**3**

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**4** Collaborative Learning Techniques

• Which students gain the most from collaborative learning?

• Is everyone happy with collaborative learning?

Thus, Part One of this handbook provides an overview of the theoretical

and research bases for collaborative learning.

**What Do We Mean by *Collaborative Learning?***

To *collaborate* is to work with another or others. In practice, collaborative

learning has come to mean students working in pairs or small groups to

achieve shared learning goals. It is learning through group work rather than

learning by working alone. There are other terms for this kind of activity,

such as *cooperative learning, team learning, group learning,* or *peer-assisted*

*learning.* In this handbook, however, we use the phrase *collaborative learning*

to refer to learning activities expressly designed for and carried out through

pairs or small interactive groups. While we believe that a flexible definition

of collaborative learning is best, there are some features that we see as

essential.

The first feature of collaborative learning is intentional design. All too

often, teachers simply tell students to get into groups and work. In collaborative

learning, however, faculty members structure intentional learning

activities for students. They may do this by selecting from a range of prestructured

activities, such as those we have included in Part Three of this

text, or they may do this by creating their own structures. Whether using

existing or new structures, the focus is on *intentional* structure.

In addition to intentional design, co-laboring is an important feature of

collaborative learning. The meaning of the Latin-based term *collaborate*

shines through as clearly today as in antiquity: to co-labor. All participants

in the group must engage actively in working together toward the

stated objectives. If one group member completes a group task while the

others simply watch, then it is not collaborative learning. Whether all group

members receive the same task, or whether members complete different

tasks that together comprise a single, large project, all students must

contribute more or less equally. Equitable engagement is still insufficient,

however.

The third feature of collaborative learning is that meaningful learning

takes place. As students work together on a collaborative assignment, they

must increase their knowledge or deepen their understanding of course curriculum.

The task assigned to the group must be structured to accomplish

the learning objectives of the course. Shifting responsibility to students, and

**5**

having the classroom vibrate with lively, energetic small-group work is

attractive, but it is educationally meaningless if students are not achieving

intended instructional goals, goals shared by the teacher and students.

Collaborative learning, then, is two or more students laboring together and

sharing the workload equitably as they progress toward intended learning

outcomes.

**What Is the Difference Between Cooperative**

**and Collaborative Learning?**

Although to most educators—and indeed to the lexicographers who compile

dictionaries—the terms *collaborative* and *cooperative* have similar meanings,

there is considerable debate and discussion as to whether they

mean the same thing when applied to group learning. Some authors use the

terms *cooperative* and *collaborative* interchangeably to mean students working

interdependently on a common learning task. Others, however, insist on a

clear epistemological distinction (Bruffee, 1995). Advocates for distinguishing

between the two suggest that cooperative learning differs from

collaborative learning in that, in cooperative learning, the use of groups

supports an instructional system that maintains the traditional lines of

classroom knowledge and authority (Flannery, 1994). To other authors,

cooperative learning is simply a subcategory of collaborative learning

(Cuseo, 1992). Still others hold that the most “sensible approach” is to view

collaborative and cooperative learning as positioned on a continuum

from most structured (cooperative) to least structured (collaborative)

(Millis & Cottell, 1998). Since those who insist on a sharp distinction

between cooperative and collaborative learning do so for epistemological

reasons, it may help to clarify the nature of the argument.

**Cooperative Learning**

The most straightforward definition of cooperative learning is “the instructional

use of small groups so that students work together to maximize their

own and each others’ learning” (Smith, 1996, p. 71). Cooperative learning

arose primarily as an alternative to what was perceived as the overemphasis

on competition in traditional education. Cooperative learning, as the

name implies, requires students to work together on a common task, sharing

information and supporting one another. In cooperative learning, the

teacher retains the traditional dual role of subject matter expert and authority

in the classroom. The teacher designs and assigns group learning tasks,

manages time and resources, and monitors students’ learning, checking to

The Case for Collaborative Learning

**6** Collaborative Learning Techniques

see that students are on task and that the group process is working well

(Cranton, 1996; Smith, 1996).

Most research and most discussion of group learning assumes a traditional

view of the nature of knowledge, namely that there is a “correct”

answer or at least a “best solution,” and that different students will have

knowledge about different aspects of the task. There is also the assumption

that the teacher is an expert in the subject matter, knows the correct answers,

and that ultimately the group should arrive at “the best” or “most logical”

or “correct” conclusion. Most teachers using interactive student learning

in their classrooms and writing about their experiences are talking about

cooperative learning. Knowingly or not, they are capitalizing on the

research findings that students who establish social relationships with

faculty and other students in the community are more actively involved in

learning, report greater personal and academic growth, and are better satisfied

with their education than are students who are more isolated (Astin,

1993; Light, 2001; Pascarella & Terenzini, 1991).

**Collaborative Learning**

Collaborative learning is based on different epistemological assumptions,

and it has its home in social constructivism. Matthews captures the essence

of the philosophical underpinnings of collaborative learning: “Collaborative

learning occurs when students and faculty work together to create

knowledge. . . . It is a pedagogy that has at its center the assumption that

people make meaning together and that the process enriches and enlarges

them” (Matthews, 1996, p. 101).

Rather than assuming that knowledge exists somewhere in reality “out

there,” and that it is waiting to be discovered by human endeavors, collaborative

learning, in its tightest definition, assumes that knowledge is socially

produced by consensus among knowledgeable peers. Knowledge is

“something people construct by talking together and reaching agreement”

(Bruffee, 1993, p. 3). Bruffee, the most ardent advocate of collaborative learning,

wants to avoid having students become dependent on the teacher as

the authority on either subject matter content or group process. Thus, in his

definition of collaborative learning, it is not up to the teacher to monitor

group learning, but rather the teacher’s responsibility is to become a member,

along with students, of a community in search of knowledge.

**Collaborative Versus Cooperative Learning**

In an article for *Change* magazine, subtitled, “Cooperative Learning *versus*

Collaborative Learning” (Bruffee, 1995, emphasis added), Bruffee contends,

“Describing cooperative and collaborative learning as complementary

**7**

understates some important differences between the two. Some of what collaborative

learning pedagogy recommends that teachers do tends in fact to

undercut some of what cooperative learning might hope to accomplish, and

vice versa” (p. 16).

The essence of his position is that, whereas the goal of cooperative learning

is to work together in harmony and mutual support to find the solution,

the goal of collaborative learning is to develop autonomous, articulate,

thinking people, even if at times such a goal encourages dissent and competition

that seems to undercut the ideals of cooperative learning.1 While

cooperative education may be appropriate for children, he says, collaborative

learning is more appropriate for college students.

Bruffee has made something of a brand name of collaborative learning

in higher education circles. He intends the role of the teacher to be less the

traditional expert in the classroom and more the peer of students. Knowledge

at the college level, he says, is “likely to address questions with dubious

or ambiguous answers, answers that require well-developed judgment

to arrive at, judgment that learning to answer such questions tends, in turn,

to develop. . . . The authority of knowledge taught in colleges and universities

should always be subject to doubt” (p. 15).

As a practical matter in planning and operating college classroom learning

groups, most teachers will not be much concerned with the philosophical

and semantic distinctions between cooperative and collaborative

learning, but will use the level of authority and control that feels comfortable

for them and that accomplishes their goals. If there is a trend in clarifying

the nomenclature of interactive group learning, however, it seems to

be in the direction of using the term *collaborative learning* in higher education

and *cooperative learning* in K–12 education.

In this handbook, we have labeled our techniques *CoLTs, Co* standing

for either “Cooperative” or “Collaborative” and *LT* standing for “Learning

Techniques,” because the techniques described come from the literature of

both cooperative and collaborative learning. Inventing a new term would

free us from the baggage accumulated by the advocates of the postmodern

version of collaborative learning, but it would also add to the jargon of

education. Instead, we follow the growing practice of using the term

*collaborative learning* to refer to interactive learning groups in higher education,

from structured to unstructured. It is important to be aware, however,

that massive confusion reigns in the literature of higher education over terminology.

Some authors writing today in higher education use the term

*cooperative learning,* and where this is the case, we will use their terminology

when discussing their work.

The Case for Collaborative Learning

**8** Collaborative Learning Techniques

**What Are the Defining Characteristics**

**of Effective Learning Groups?**

Learning groups exist in many sizes and forms and are created for a wide

variety of purposes. Some learning groups are ad hoc, in-class arrangements

of convenience that last only a few minutes. For example, in *CoLT 1: Think-*

*Pair-Share,* the instructor asks students to turn to a nearby neighbor to discuss

briefly a point made in the lecture. Other teachers may use *CoLT 3: Buzz*

*Groups,* consisting of four to six students grouped for ten to fifteen minutes.

This CoLT gives students an opportunity to explore other learners’ reactions

to course-related questions. There are also more intentionally structured

groupings, often organized around specific assignments, such as *CoLT 15:*

*Case Studies* or *CoLT 18: Group Investigation.* In these activities, students may

work together for days or weeks until the assignment is completed.

Sometimes groups work together on a course-long project. Membership

can remain the same or change depending on the learning goals. There are

also long-term “learning communities” that may last a semester or an

academic year. Learning communities typically involve integration of curricula,

team teaching, and other institutional changes designed to give students

a feeling of belonging to a “community” of learners (Gabelnick,

MacGregor, Matthews, & Smith, 1990; Matthews, Smith, MacGregor, &

Gabelnick, 1997; Tinto, Love, & Russo, 1994).

Groups may be identified with particular teaching methods—such as

the case-study method or problem-based learning—in which the purpose

is to accomplish specified cognitive goals such as critical thinking and problem

solving. There are groups based on an epistemology, such as Bruffee’s

purist definition of collaborative learning. When interacting, these groups

purposely implement social constructivist learning theory, a theory

contending that knowledge is socially constructed by consensus among

knowledgeable peers (Bruffee, 1995; Vygotsky, 1978).

Johnson and colleagues (Johnson et al., 1991) distinguish types of

groups on the basis of duration and purpose. *Formal* learning groups last

from one class period to several weeks, whatever it takes to complete a specific

task or assignment. The purpose is to use the group to accomplish

shared goals, to capitalize on different talents and knowledge of the group,

and to maximize the learning of everyone in the group. *Informal* groups are

temporary groups that last for only one discussion or one class period. Their

major purpose is to ensure active learning. They might be used, for example,

to break up a lecture with peer exchanges that require students to

organize, explain, and otherwise cognitively process their learning. *Base*

groups are long-term groups with a stable membership, more like learning

**9**

communities. Their main purpose is to provide support and encouragement

and to help students feel connected to a community of learners.

In the extensive literature on cooperative learning in K–12, there are

dozens of “brand-name” types of cooperative learning groups, each

endowed by its creator with particular structural elements that are thought

(or demonstrated through research) to enhance learning. Slavin (1996), for

example, describes in some detail five methods that have been developed

and extensively researched. Although there are distinctive differences in the

purposes and philosophies guiding the formulation and operation of

groups for learning, it is nevertheless true that all groups share two fundamental

purposes: to engage students actively in their own learning and to

do so in a supportive and challenging social context.

There is substantial agreement in the literature on what interactive group

learning is, as well as what it is not. Karl Smith captures nicely some common

misunderstandings about the nature of cooperative/collaborative learning.2

*Many faculty who believe they are using cooperative learning are in fact*

*missing its essence. There is a crucial difference between simply putting*

*students in groups to learn and structuring cooperation among students.*

*Cooperation is not having students sit side by side at the same table to*

*talk with one another as they do their individual assignments. Cooperation*

*is not assigning a report to a group of students, on which one student*

*does all the work and the others put their names. Cooperation is not having*

*students do a task individually and then having the ones who finish*

*first help the slower students. Cooperation is much more than being*

*physically near other students, discussing material with other students,*

*or sharing material among students, although each of these is important*

*in cooperative learning (Smith, 1996, p. 74).*

In contrast to what cooperative learning is *not,* Smith (1996, pp. 74–76)

identifies what it *is* by listing five elements that he considers essential for

successful cooperative learning groups (see also Johnson, Johnson, & Smith,

1998, pp. 21–23).

1. *Positive interdependence:* The success of individuals is linked to the success

of the group; individuals succeed to the extent that the group

succeeds. Thus students are motivated to help one another accomplish

group goals.

2. *Promotive interaction:* Students are expected to actively help and support

one another. Members share resources and support and encourage each

other’s efforts to learn.

3. *Individual and group accountability:* The group is held accountable for

achieving its goals. Each member is accountable for contributing his or

her share of the work; students are assessed individually.

The Case for Collaborative Learning

**10** Collaborative Learning Techniques

4. *Development of teamwork skills:* Students are required to learn academic

subject matter (task work) and also to learn the interpersonal and smallgroup

skills required to function as part of a group (teamwork). Teamwork

skills should be taught “just as purposefully and precisely as

academic skills” (p. 75).

5. *Group processing:* Students should learn to evaluate their group productivity.

They need to describe what member actions are helpful and

unhelpful, and to make decisions about what to continue or change.

Virtually all collaborative learning methods emphasize the importance

of *promotive interaction* and *individual accountability.* Students must not only

learn to work together, but they must also be held responsible for their

teammates’ learning as well as their own. Slavin, in particular, has been

insistent that successful groups must endorse individual accountability and

team rewards. “It is not enough,” he says, “to simply tell students to work

together; they must have a reason to take one another’s achievement seriously”

(Slavin, 1996, p. 21).

Collaborative learning, then, is a structured learning activity that

addresses major concerns related to improving student learning. It involves

students actively, thereby putting into practice the predominant conclusion

from a half-century of research on cognitive development. It prepares students

for careers by providing them with opportunities to learn the teamwork

skills valued by employers. It helps students appreciate multiple

perspectives and develop skills to collaboratively address the common

problems facing a diverse society. And it engages all students by valuing

the perspective each student can contribute from his or her personal academic

and life experience. That said, collaborative learning is not an educational

panacea. Collaborative learning is an appropriate method for

achieving some learning goals and tasks, but not for others. In most cases,

we see collaborative learning not as a replacement for lecture, discussion,

or other traditional methods, but rather as a useful complement.

**What Is the Pedagogical Rationale**

**for Collaborative Learning?**

The closing decades of the twentieth century were exceptionally rich in producing

a better understanding of the learning process. Critical to our understanding

of that process is the basic tenet of modern cognitive theory:

learners must be *actively engaged* in learning. Neurologists and cognitive scientists

agree that people quite literally “build” their own minds throughout

life by actively constructing the mental structures that connect and

**11**

organize isolated bits of information. Much as we would like to think that

we as teachers can “tell” students what we have learned and thus transfer it

into their heads efficiently and accurately, the evidence is clear that we

cannot “transfer” our knowledge ready-made into student minds. Instead,

students must do the work of learning by actively making connections and

organizing learning into meaningful concepts.

**The Importance of Making Connections**

There is growing evidence that learning is about making connections—

whether the mental connections are established by firing synapses in the brain,

the “ah ha” experience of seeing the connection between two formerly isolated

concepts, or the satisfaction of seeing the connection between an academic

abstraction and a “hands-on” concrete application. The important concept is

that learners must actively make the connections in their own brains and

minds that produce learning for them (Cross, 1999).

**Neurological Connections**

Stunning new research on the brain by neuroscientists is adding a new

dimension to our knowledge about learning, and it is reinforcing rather

than changing the tentative conclusions from cognitive science. Neuroscientists

have developed a rich imagery about how the brain works. Children

do not come into the world with a brain that is hard-wired like a computer.

Rather, throughout life, they “grow” their own brains by constantly making

connections in the circuitry of the brain through experience and learning.

Research is showing that the circuitry of the brain is wired by neurons

that spin out axons. These axons connect with many targets to form the

transmission lines that carry electrical impulses. At the end of each “wire”

is a bulb-and-button unit called a *synapse.* When an electrical signal reaches

the button-like ending, a chemical message crosses the gap in the synapse

to connect with the receiving cell. Scientists believe that at birth a baby’s

brain contains 100 billion neurons. Sensory stimulation strengthens

connections. Alternatively, “through a process that resembles Darwinian

competition, the brain eliminates connections or synapses that are seldom

or never used” (Nash, 1997, p. 50). “Use it or lose it” appears to be quite true

when applied to the “brain work” of learning. Researchers find that children

who are deprived of sensory stimulation develop brains that are 20–30

percent smaller than normal for their age. Although much remains to be

learned about the neurological growth of the brain, new insights into the

physical development of the brain closely parallel what we are learning

about the mental processes of learning.

The Case for Collaborative Learning

**12** Collaborative Learning Techniques

**Cognitive Connections**

The parallels between the neurological brain and the working mind envisioned

by cognitive scientists are quite remarkable. Modern cognitive science

postulates a structure of the mind known as the *schema*—or in plural

form, *schemata,* since the brain develops many schemata for different topics.

A schema is a cognitive structure that consists of facts, ideas, and associations

organized into a meaningful system of relationships. People have

schemata for events, places, procedures, and people, for instance. A person’s

schema for a place, such as a college, might include concepts such as

location, reputation, the characteristics of the student population, style of

campus architecture, even the location of campus parking lots. Thus, the

schema is an organized collection of bits of information that together build

the concept of the college for each individual. When someone mentions the

college, we “know” what he or she means, but the image brought to mind

may be somewhat different for each individual.

What students can learn depends, to a larger extent than previously

assumed, on what they already know. It is easier to learn something when

we already have some background than it is to learn something completely

new and unfamiliar. For example, advanced courses in a subject are

often easier to teach and to learn than introductory courses. Cognitive theory

would explain that paradox by observing that if the schema is very

sparse with respect to a particular subject, connections are hard to find and

make, whereas if the schema already has a dense network of vocabulary,

terms, and concepts, it is easier to make the connections that constitute

learning.

This fundamental assumption about the role of prior knowledge in

learning was tested in a classic experiment that compared novice and expert

chess players’ ability to memorize the layout of chess pieces (de Groot,

1966). Chess players of different skill levels were shown the game pieces on

a chessboard for a few seconds and then asked to recall the position of the

pieces. The novice players were able to place only five or six pieces correctly,

but the experts could recreate nearly the whole board. However, when these

players were shown the pieces placed randomly on the board (rather than

positions from a real game), novices and experts performed about the same.

The conclusion from this rather simple experiment is that the superior performance

of experienced chess players in recalling chess positions was not

due to higher IQs or to better memories, but rather to a schema for chess

that enabled experienced players to associate the patterns shown with those

already in memory. The point is that what one knows about a given subject

has a substantial impact on the learning process. When teachers complain

**13**

that students “can’t read,” they refer not only to the lack of reading skills,

but also to the density of the schema for a particular subject matter.

Much of traditional instruction is based on the old images of the mind

as an empty vessel, in which the teacher opens the heads of students and

pours in new information that adds to their knowledge. Thus we speak

erroneously of students knowing “more” as we add to their storehouse of

information. Paulo Freire (1970) refers to the “banking model” of education,

in which the teacher deposits information that students store to withdraw

later. The new cognitive science rejects the notion that real learning occurs

when new information simply rests on top of the existing cognitive

structure. Alfred North Whitehead (1929) captured the wisdom of active

learning in these words: “Beware of inert ideas—ideas that are merely

received into the mind without being utilized, or tested, or thrown into fresh

combinations.”

Some researchers refer to “deep” and “surface” learning to distinguish

between learning that makes the connections that lead to deeper *understanding*

versus *information,* which rests lightly on the surface, inert and

unassimilated (Ramsden, 1992). A finer distinction was made by Säljö,

who asked adult learners what they understood by “learning” (Säljö, 1979,

cited in Ramsden, 1992, pp. 26–27). Säljö categorized their answers in a

hierarchical pattern, observing that each higher conception implied all that

preceded it:

1. Learning is acquiring information or “knowing a lot.”

2. Learning is memorizing or “storing” information.

3. Learning is acquiring facts and skills that can be used.

4. Learning is making sense or “making meaning” of the various parts of

information.

5. Learning involves comprehending or understanding the world by reinterpreting

knowledge.

We find, in the literature of learning, all of these conceptions of learning—

and to some extent, none—are completely inappropriate. But Berkeley

researchers Lyman and Varian note that worldwide information production

increased by 30 percent *each year* between 1999 and 2002. “All of a sudden,”

says Lyman, “almost every aspect of life around the world is being recorded

and stored in some information format” (Lyman & Varian, 2003). The computer

is so far superior to the human brain in storing and retrieving information

that most instruction and learning at the college level is addressing

Säljö’s definitions 3, 4, and 5.

The Case for Collaborative Learning

**14** Collaborative Learning Techniques

**Social Connections**

Vygotsky invented the awkward term “zone of proximal development”

(ZPD) to indicate “the distance between the actual developmental level as

determined by independent problem solving and the level of potential

development as determined through problem solving under adult guidance

or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). The

theory, applied to cooperative learning, is that students come to the group

with diverse backgrounds, but enough overlap to form a common base for

communication. Exposing all students to concepts and understandings that

are within their ability to grasp, but not yet part of their personal understanding,

enables each to learn from other students those concepts that are

just beyond their current level of development. Thus, theoretically at least,

academically poor students would stand to learn more from better-prepared

students than vice versa. Some would claim that the better students are

wasting their time, explaining things that they already know. However,

ample evidence suggests that peer tutors gain a great deal from formulating

and explaining their ideas to others.

**What Is the Evidence That Collaborative Learning**

**Promotes and Improves Learning?**

To answer this question, we look at the research on peer influence, college

environments, collaborative learning in the classroom, and student

satisfaction.

**Research on Peer Influence**

Research support for the impact of peers on student learning is extensive,

and it comes from broad-scale studies of college environments as well as

from studies directed more specifically to the effects of collaborative learning

in the classroom. To date, there is an impressive amount of research, and

it comes from highly credible sources.

In 1969, Feldman and Newcomb synthesized the findings of more than

1,500 studies in their now-classic book, *The Impact of College on Students.* In

1991, Pascarella and Terenzini set for themselves the ambitious task of

updating the research that had accumulated since Feldman and Newcomb.

In a nearly 1,000-page treatise entitled, *How College Affects Students,* they

reviewed more than 2,500 publications, concluding basically that “students

not only make statistically significant gains in factual knowledge and in a

range of general cognitive and intellectual skills, they also change on

a broad array of values, attitudinal, psycho-social, and moral dimensions”

(p. 557). A large part of this documented change, Pascarella and Terenzini

**15**

conclude, is determined by the extent to which students interact with faculty

members and student peers in and out of the classroom (p. 620).

The demonstrated effect of the social impact of college has stimulated

sophisticated theory building on student development as well as further

research on learning in the classroom, including the effect of cooperative

and collaborative learning. Colleges, under the gun to hold themselves

accountable for student learning and to present evidence of such,3 are

collecting their own data about student engagement with the people and

activities of the college via such well-known instruments as the National

Survey of Student Engagement (NSSE) and the Community College Survey

of Student Engagement (CCSSE) (Community College Leadership Program,

2003; Kuh, 2000). The current high interest in student engagement derives

in part from cognitive research on the importance of active or engaged

learning in the classroom, but it also springs from a long history of interest

in the impact of college environments on student attitudes, values, persistence,

satisfaction, and motivation for learning (Astin, 1968; Chickering,

1969; Jacob, 1957).

**Research on College Environments**

Alexander Astin’s large-scale statistical studies across hundreds of colleges

and thousands of students, using twenty-two measures of student learning

outcomes, concluded that two factors had a special potency in academic

achievement, personal development, and student satisfaction with college:

interactions with fellow students and interactions with faculty members.

Astin concluded, “Research has consistently shown that cooperativelearning

approaches produce outcomes that are superior to those obtained

through traditional competitive approaches, and it may well be that our

findings concerning the power of the peer group offer a possible explanation:

Cooperative learning may be more potent than traditional methods of

pedagogy because it motivates students to become more active and more

involved participants in the learning process” (1993, p. 427).

Richard Light, using a different approach to the study of student learning

in college, studied one college intensively. He and his colleagues interviewed

570 Harvard undergraduates to see what learning experiences they

valued most in their college years. He concluded, “All the specific findings

point to, and illustrate one main idea. It is that students who get the most

out of college, who grow the most academically, and who are happiest,

*organize their time to include interpersonal activities with faculty members, or with*

*fellow students built around substantive, academic work”* (Light, 1992, p. 6,

emphasis in the original).

The Case for Collaborative Learning

**16** Collaborative Learning Techniques

The grand synthesis of research on learning in college is widely known

as the *Seven Principles for Good Practice in Undergraduate Education.* The principles

“rest on 50 years of research on the way teachers teach and students

learn, how students work and play with one another, and how students and

faculty talk to each other” (Chickering & Gamson, 1987). The first three

principles are

1. Good practice encourages student–faculty contact.

2. Good practice encourages cooperation among students.

3. Good practice encourages active learning.

These three principles apply to both the college environment and the

classroom, and they are the backbone of collaborative learning.

**Research on Collaborative Learning in the Classroom**

Light’s (1992) conclusion from the Harvard studies on the productivity of

interactions built around substantive academic work is especially important

to classroom teachers, and it is vital to our discussion of collaborative

learning in college classrooms. While broad studies of the impact of college

on students offer evidence that learning in a social context makes positive

contributions to a student’s college education, the claims for collaborative

learning go further. In particular, there is high interest in two important outcomes:

(1) What group learning contributes to content mastery, critical

thinking, problem solving, and other cognitive attributes, and (2) what

group learning contributes to the development of interpersonal skills and

other noncognitive factors that are valued in careers and citizenship.

Teachers over the generations have searched for the “best” method

of teaching, and there has been considerable research comparing various

teaching methods. Psychologists at the University of Michigan reviewed

more than five hundred research studies pertaining to teaching and learning

in college classrooms. When asked what is the most effective teaching

method, McKeachie and his colleagues answered that it depends on the

goal, the student, the content, and the teacher—but the next best answer is,

“Students teaching other students” (McKeachie, Pintrich, Lin, & Smith,

1986, p. 63).

Collaborative learning, capitalizing on the value of peer interaction, has

produced a huge amount of research comparing collaborative learning with

other teaching/learning methods as well as attempting to identify the most

effective models of cooperative/collaborative learning. As of November

2003, there were 6,887 items listed in ERIC under the descriptor “cooperative

learning,” and 3,537 of these were published journal articles. While

many of these relate to the extensive interest in cooperative learning in

**17**

K–12, more than 1,979 of the items on cooperative learning were indexed to

higher education. In addition, there were 909 published journal articles on

“collaborative learning,” 432 of these specifically keyed to collaborative

learning in higher education (accessed November 12, 2003). With such an

extensive body of literature, it is helpful to have available a large number

of syntheses and meta-analyses taking on the task of synthesizing the

research on cooperative/collaborative learning.

Virtually all of the compilers and synthesizers of research findings

regarding group learning come to largely positive conclusions (Cuseo, 1992;

Johnson et al., 1991; Johnson, Johnson, & Stanne, 2000; Millis & Cottell, 1998;

Natasi & Clements, 1991; Slavin, 1990; Springer, Stanne, & Donovan,

1998). Natasi and Clements reflect the nature and tone of much of the

research, concluding, “Cognitive-academic and social-emotional benefits

have been reported for students from early elementary through college

level, from diverse ethnic and cultural backgrounds, and having a wide

range of ability levels. . . . Furthermore, cooperative learning has been used

effectively across a wide range of content areas, including mathematics,

reading, language arts, social studies and science” (1991, p. 111, quoted in

Millis & Cottell, 1998, pp. 8–9).

There are, by this time, literally dozens of different models of cooperative/

collaborative learning groups. Data are presented in exhausting detail

by Slavin (1989–90, 1990, 1996) and the Johnson brothers (Johnson &

Johnson, 1994; Johnson et al., 1991; Johnson, Maruyama, Johnson, Nelson,

& Skon, 1981), who have been the most prodigious compilers and reviewers

of research on cooperative learning groups in K–12. (The term *cooperative*

*learning* is used in reporting research results from K–12 because that is

the term and conditions used by the researchers.)

Johnson and his colleagues at the University of Minnesota have

concentrated largely on comparing learning outcomes from three types of

learning structures: cooperative, competitive, and individualistic. *Cooperative*

*learning* involves “promotive interaction,” in which students encourage the

achievement of other members of the group while also working on their

own achievement in order to accomplish group goals. *Competitive structures*

are found in environments in which students focus on “increasing their own

achievement and on preventing any classmate from achieving higher

than they do.” And *individualistic structures* are more like mastery learning

in which no interaction exists; “students focus only on improving their own

achievement and ignore as irrelevant the efforts of others” (Johnson et al.,

1991, p. 31).

In extensive meta-analyses across hundreds of studies, cooperative

arrangements were found superior to either competitive or individualistic

The Case for Collaborative Learning

**18** Collaborative Learning Techniques

structures on a variety of outcome measures, generally showing higher

achievement, higher-level reasoning, more frequent generation of new

ideas and solutions, and greater transfer of what is learned in one situation

to another. The Johnson team concluded, “Cooperative learning is indicated

whenever the goals of learning are highly important, mastery and retention

are important, the task is complex or conceptual, problem solving is desired,

divergent thinking or creativity is desired, quality of performance is

expected, and higher level reasoning strategies and critical thinking are

needed” (1991, p. 40). Given that conclusion, it is hard to think of any educational

situation in higher education in which cooperative learning would

*not* be recommended by the Johnson team.

Robert Slavin at Johns Hopkins University also reported highly positive

results (1989–90, 1990, 1996). Slavin’s particular research interest is in comparing

the outcomes from various models of cooperative learning as well

as comparing cooperative learning groups with traditional control groups.

He located ninety studies that met his rigorous criteria for research design.

His analysis of these studies is set forth in extensive tables (Slavin, 1996)

and in more detail than is appropriate to report here, but Slavin, like the

Johnson team, concluded that achievement under cooperative learning

structures was significantly positive. The size of the effect differed depending

on the particular type of cooperative learning structure. Slavin’s most

important conclusion is that “cooperative learning has its greatest effects

on student learning when groups are recognized or rewarded based on the

individual learning of their members” (Slavin, 1996, p. 52). Students must

have an incentive, he says, to help each other put forth maximum effort.

“If a group member wants her group to be successful,” reasons Slavin,

“she must teach her group mates (and learn the material herself). If she

simply tells her group mates the answers, they will fail the quiz that they

must take individually” (p. 53). Slavin’s conclusion, after extensive review

of research on cooperative learning in K–12, is that “cooperative learning

methods can be an effective means of increasing student achievement, but

only if they incorporate group goals and individual accountability” (Slavin,

1990, p. 32).

Research on group learning in higher education is more limited, but

recently Springer, Stanne, and Donovan (1999) conducted an impressive

meta-analysis of the effects of small-group learning on student achievement,

persistence, and attitudes in classes in undergraduate science, mathematics,

engineering, and technology (SMET). Their work directs research attention

to assessing student learning under the conditions of live classroom

settings. They located 383 reports related to small-group learning in postsecondary

SMET from 1980 or later. Thirty-nine of the studies met their

**19**

exacting requirements for providing adequate research data on achievement,

persistence, and/or attitudes. In condensed form, their major

conclusions are as follows:

• SMET students who learned in small groups demonstrated greater

achievement than students in traditional instruction (d = .51, which is

roughly equivalent to moving a student from the 50th to the 70th

percentile on a standardized test).

• The effects of small-group learning on achievement were significantly

greater when measured on instructor-made exams or grades than on

standardized instruments.

• Student persistence was significantly higher in small-group learning

classes than in traditional classes (d = .46, which is enough to reduce

attrition from SMET classes by 22 percent).

• The findings were equally positive for women and men, SMET majors

and non-majors, first-year and other students, and for underrepresented

minorities (African Americans and Latinas/Latinos).

• Small-group learning leads to more favorable attitudes toward learning

of the material.

• Out-of-class meetings (typically study sessions) have greater effects on

achievement than in-class collaboration, but in-class collaborations have

more favorable effects on student attitudes than out-of-class meetings.

In a succinct summary of their meta-analysis, the researchers offer this

conclusion: “Students who learn in small groups generally demonstrate

greater academic achievement, express more favorable attitudes toward

learning, and persist through SMET courses or programs to a greater extent

than their more traditionally taught counterparts. The reported effects are

relatively large in research on educational innovation and have a great deal

of practical significance” (Springer et al., 1999, p. 42).

**Research on Student Satisfaction**

The evidence is strong and quite consistent across a broad array of educational

research studies that students who study under various forms of peer

interaction, including class discussion (versus lecture), have more positive

attitudes toward the subject matter, increased motivation to learn more

about the subject, and are better satisfied with their experience than

students who have less opportunity to interact with fellow students

and teachers (Johnson et al., 1991; Light, 1992; Springer, Stanne & Donovan,

1998). The data also indicate that students working in learning groups like

the instructor better and perceive the instructor as more supportive and

The Case for Collaborative Learning

**20** Collaborative Learning Techniques

accepting academically and personally (Fiechtner & Davis, 1992; Johnson

et al., 1991).

Cabrera (1998) found, in a study of more than two thousand students

completing their second year of study at twenty-three campuses, that participation

in cooperative learning groups was positively related to perceived

gains in personal development, appreciation for fine arts, analytical skills,

and understanding of science and technology as measured by the College

Student Experiences Questionnaire (CSEQ). Fiechtner and Davis (1992)

sought student reactions to cooperative learning experiences in upperdivision

classes at two universities. Asking students to rate the effectiveness

of their group experiences on an eighteen-item survey, they found, in

four different administrations of the survey, that 74–81 percent of the

students rated their cooperative learning experience “significantly” or

“somewhat more effective” than traditional college instruction in general

academic achievement; 70–82 percent felt that their group experience was

superior in promoting higher-level thinking skills; and 75–86 percent

claimed it promoted greater interest in the subject matter. A striking 83–90

percent claimed better class morale under conditions of group learning.

**Which Students Gain the Most**

**from Collaborative Learning?**

Although most studies evaluating the effects of group learning for different

kinds of students claim equal benefits for students across a wide range

of backgrounds and abilities, some researchers report that underprepared

students may benefit more from student-led discussions than better students

(Gruber & Weitman, 1962). The explanation offered is that when a

group contains sufficient student resources of knowledge and higher-level

thinking skills, less skilled students may be helped to restructure and

deepen their understanding.

However, there is also ample research and experiential evidence to suggest

that in peer tutoring, students *doing* the teaching learn more, especially

at a conceptual level, than students receiving the tutoring (Annis, 1983;

McKeachie et al., 1986). Teachers who have spent many hours preparing a

lecture or designing a learning exercise know firsthand that organizing

knowledge to explain it to others is a powerful learning experience. Thus,

there should be considerable value to good students in having to organize

and articulate their own learning to make it understandable to others.

Indeed, Slavin (1996, p. 53) found in his review across hundreds of research

studies that “students who give each other elaborated explanations (and,

less consistently, those who receive such explanations) are the students who

learn the most in cooperative learning.”

**21**

Taken as a whole, the research appears to substantiate the claim that both

underprepared and well-prepared students benefit from group learning, but

perhaps for different reasons. Good students may benefit from having to

formulate their thoughts and knowledge into concepts understandable

to others, while academically poorer students may benefit from the explanations

of their peers.

Other categories of students in which there is high interest is any group

that has been underrepresented in higher education in the past. Obtaining

diversity in student populations is appealing to colleges for pedagogical as

well as social reasons. The evidence is strong—for a variety of reasons—

that students who might be considered nontraditional college students prefer

cooperative group learning and stand to benefit more from it than

traditional students. Women, members of underrepresented racial and

ethnic groups, adult and re-entry students, commuters, and international

students have been identified as students for whom peer and group learning

seem especially valued and valuable.

In a study of 2,051 students at twenty-three institutions, Cabrera (1998)

found that minority students expressed a greater preference for learning in

groups than did majority students, and Treisman (1985) found that the fiveyear

retention rate for African American students majoring in mathematics

or science at Berkeley was 65 percent for those who were involved in collaborative

learning groups, compared with 41 percent for African American

students not involved. In an intensive study of a special program for ethnically

diverse calculus students at the University of Wisconsin, Millar (1999)

reported positive findings on the effectiveness of learning in groups. The

Wisconsin learning groups emphasized three factors: intensive group work,

carefully chosen and very difficult problems, and instructors who function

as guides. Students learning under these conditions were about twice as

likely as other students to receive a B or above in calculus, and they “showed

higher levels of confidence in their mathematical ability and greater comfort

in performing calculus problems; learned to value multiple and creative

ways of problem solving; and developed the interest and ability to acquire

a deeper, more conceptual understanding of calculus” (pp. 8–9).

This finding is consistent with the Harvard studies that found that students

who persist to degree completion in science tend to work in small,

student-centered study groups, whereas students who leave science rarely

report working with other students (Light, 1992). These findings may

be especially significant for women, who tend to transfer out of the sciences

more frequently than men (Tobias, 1990) and who tend to favor the

more collaborative learning styles that are associated with “connected

knowing”—in other words, gaining access to knowledge through other people

(Belenky, Clinchy, Goldberger, & Tarule, 1986).

The Case for Collaborative Learning

**22** Collaborative Learning Techniques

The simple answer to the question, *Who benefits from group learning situations?*

seems to be “Almost everyone.” Furthermore, it appears that group

work enhances and enriches a goal that many colleges consider paramount

for students today: learning from diversity. Cuseo notes, “Cooperative learning

has the potential to capitalize on the contemporary wave of student

diversity—converting it from a pedagogical liability (which instructors must

somehow adapt to or accommodate) into a pedagogical asset—by capitalizing

on the multiple, socio-cultural perspectives that can be experienced when

students from diverse backgrounds are placed in heterogeneously-formed

cooperative learning groups” (1996, p. 24).

**Is Everyone Happy with Collaborative Learning?**

Research on instructional methods is sometimes criticized for comparing

carefully designed experimental methods with average, across-the-board,

traditionally taught classes. This is, in a sense, “stacking the cards” in favor

of the experimental method. It may be that the reason for the generally

positive findings in the published reports of the contributions of group

learning to achievement is that the groups studied are usually carefully

structured to accomplish student learning. Research on lectures that were

carefully planned to raise questions and involve students in actively thinking

about what was being said would also show more positive results than

across-the-board studies of the efficacy of active lecturing.

To answer the criticism of comparing well-designed collaborative learning

methods with average, across-the-board traditional teaching, Wright

and colleagues (Wright, Millar, Kosciuk, Penberthy, Williams, & Wampold,

1998) conducted an interesting and powerful comparison of the “best”

lecture/discussion classes with the “best” cooperative learning classes in

analytical chemistry at the University of Wisconsin. They placed considerable

emphasis on careful assessment of the learning that was taking place.

In their words, their assessment strategy “emerged from an ad hoc committee

of skeptical chemistry faculty who met prior to the 1995 course. They

concluded that the only type of assessment data they would find credible

would be faculty-conducted oral examinations of all students. It was important

that the assessment be done orally in order to probe student understanding

and problem-solving ability. It was also important that the

assessment involve external faculty who are independent of the course

faculty” (p. 987).

Their findings left little doubt that students in the cooperative learning

classes “had quantifiably better reasoning and communication skills” than

**23**

students taught in lecture/discussion classes. Moreover, both student and

faculty questionnaires showed “very significant differences in the perception

of the students’ preparation for future science courses” (p. 989). This

study, published in the *Journal of Chemical Education,* is one of the most carefully

designed research studies of instructional methods that we found in

our search of the research on collaborative learning in higher education.

**Issues on Which Research Is Lacking**

The aggregated evidence from research studies appears highly positive, but

we found student criticism or dissatisfaction with group work strangely lacking

in the research reports. The research just did not seem to report on or

take cognizance of the student criticisms that every instructor who has tried

group work hears from time to time. We found that any criticisms of learning

groups were enumerated largely in the work of practitioners. Miller and

her colleagues reported their experiences in teaching a biology class: “Some

groups literally crackle with excitement and creativity. All members seem to

live, breathe, eat, and sleep the current project and are ecstatic with their

working arrangements. . . . At the opposite end of the spectrum, there are

groups in which one or more members cannot be reached by telephone, do

not show up for meetings, break commitments to their group and in the

worst case disappear for several weeks with the entire group’s work in their

possession” (Miller, Trimbur, & Wilkes, 1994, p. 34).

We also found a report of negative as well as positive student reactions

on a Web site (http://www.wcer.wisc.edu/nise/CL1/CL/story/middlecc/

TSCMA.htm). Cathy Middlecamp asked two hundred students in a chemistry

class for non-majors at the University of Wisconsin to give advantages

and disadvantages of the group work that she had used from time to time in

the class. While she disavows a systematic research approach to the collection

of data, her posting on the Web of a sample of student comments

regarding cooperative learning groups will ring true to many practitioners.

The advantages listed by students consist of those that appear commonly

in the literature of cooperative and collaborative learning. They include

recognition that different members of the group bring different knowledge

and talents to bear, that deeper learning results from the discussion, that

students are less hesitant to speak or raise questions in small peer groups

than in a large class or with the instructor, and that working in groups is

more fun and gives students an opportunity to know their fellow students

better. Some students, especially business majors, were also likely to mention

the career value of learning to work on teams.

The disadvantages listed by students included recognition that people

need to go at different speeds, that some students dominate the group while

The Case for Collaborative Learning

**24** Collaborative Learning Techniques

others are “easy riders” who fail to pull their fair share, that discussion gets

off the topic and wastes time, and that some groups “just don’t get along.”

The advantages listed by students appear to represent the outcomes of

groups that are productive, well planned, and carefully monitored. The

disadvantages represent groups that are dysfunctional for one or more

reasons, most of which are probably correctable. The purpose of this handbook

is to help faculty capitalize on the advantages and defuse the disadvantages

inherent in group work (see “Addressing Problems” in Chapter

Five, Facilitating Student Collaboration).

There is almost no research on groups that fail, and more specifically,

how that experience impacts the learning of its members. Does collaborative

learning carry risks if done poorly? We assume so, but we just don’t

know what students learn from a poorly run group. The evidence, however,

is so strong that collaborative learning has multiple advantages if done well,

that it would be folly not to learn how to operate collaborative learning

groups productively.

Much to our surprise, we found no attempt to systematically study the

impact of collaborative learning on teachers. Does it take more time? Does

it sacrifice “coverage” of material? Does it result in greater satisfaction in

the profession of teaching? What are the rewards, intrinsic and extrinsic?

We just don’t know via systematic research study the answers to these

questions. There are scattered testimonials to the satisfaction of working

closely with colleagues, and a growing band of devotees offer anecdotes on

their increased interest in teaching via collaborative learning. Certainly

centers established on campuses to improve teaching and learning are

increasingly using workshops, faculty mentors, team teaching, and what

could be called “collaborative learning for teachers” as the basic formula

for their work.

In 1993, TIAA/CREF established the Hesburgh Awards “to acknowledge

and reward successful, innovative faculty development programs that enhance

undergraduate teaching.” Areview of 450 Hesburgh finalists between 1993

and 2001 illustrated the impact of collaborative learning for faculty development

(Cross, 2001). Apredominant feature of these cutting-edge programs was

the emphasis on collaborative learning for faculty: faculty members were collaborating

across disciplines and generations to share the “wisdom of practice.”

As faculty find satisfaction and professional growth in collaboration,

perhaps they will carry their experiences with their own learning into their

classrooms. But the fact remains that there is little research to document advantages

and disadvantages to teachers of collaborative learning.

**25**

**Conclusion**

Collaborative learning seems to be a teaching/learning innovation whose

time has come. Done well, it puts into practice the major conclusions from

modern cognitive learning theory, specifically, that students must be

actively engaged in building their own minds. Research to date supports

and enriches the theory. There is a large amount of empirical evidence that

small groups of peers learning together have advantages for academic

achievement, motivation, and satisfaction. As Millis and Cottell (1998, p. 24)

conclude, “The good news is that the research consistently shows that structured

small-group work that builds on positive interdependence and individual

accountability also raises student achievement.” There does not seem

to be much “bad news” in the research findings. But most of the research

reported in the literature is on carefully structured groups, designed to

accomplish learning. The critically important qualifications that have

emerged from that research are that positive interdependence and individual

accountability are factors that make for success.

As more and more faculty in higher education introduce collaborative

learning into their classrooms, the accumulation of research and wisdom

will grow. But there is already plenty of experience to help classroom teachers

avoid the pitfalls and capitalize on the potential of collaborative learning.

Amajor purpose of this handbook is to pull together information from

both research and experience to help teachers design creative, challenging,

and effective group assignments.

**Notes**

1. While Bruffee (1995) assumes that cooperative learning does not involve

conflict, Johnson and Johnson (1994, p. 67) assert that “within cooperative

learning groups, intellectual conflict should be encouraged and nurtured,

rather than suppressed or avoided.”

2. Karl Smith and the Johnson brothers have spent many years leading the

cooperative learning movement in K–12. In turning their attention recently to

higher education, they have brought with them the term *cooperative learning.*

3. The *Handbook of Accreditation* of WASC sets forth standards that require

“evidence of educational effectiveness, including student learning” (Western

Association of Schools and Colleges, 2001, p. 29).

The Case for Collaborative Learning