Scientific
Research

What is Collaborative Learning[*]

ABSTRACT

"Collaborative learning" is an umbrella term for a variety of educational approaches involving joint intellectual effort by students, or students and teachers together. Usually, students are working in groups of two or more, mutually searching for understanding, solutions, or meanings, or creating a product. Collaborative learning activities vary widely, but most center on students' exploration or application of the course material, not simply the teacher's presentation or explication of it.

Keywords: *Collaborative Learning, Problem-Centered Instruction, Peer Teaching*

1. Introduction

Collaborative learning represents a significant shift away from the typical teacher-centered or lecture-centered milieu in college classrooms. In collaborative classrooms, the lecturing/listening/note-taking process may not disappear entirely, but it lives alongside other processes that are based in students' discussion and active work with the course material. Teachers who use collaborative learning approaches tend to think of themselves less as expert transmitters of knowledge to students, and more as expert designers of intellectual experiences for students-as coaches or mid-wives of a more emergent learning process.

2. Assumptions about Learning

Though collaborative learning takes on a variety of forms and is practiced by teachers of different disciplinary backgrounds and teaching traditions, the field is tied together by a number of important assumptions about learners and the learning process.

2.1. Learning is an Active, Constructive Process

To learn new information, ideas or skills, our students have to work actively with them in purposeful ways. They need to integrate this new material with what they already know-or use it to reorganize what they thought they knew. In collaborative learning situations, our students are not simply taking in new information or ideas. They are creating something new with the information and ideas. These acts of intellectual processing- of constructing meaning or creating something new-are crucial to learning.

2.2. Learning Depends on Rich Contexts

Recent research suggests learning is fundamentally influenced by the context and activity in which it is embedded (Brown, Collins and Duguid, 1989). Collaborative learning activities immerse students in challenging tasks or questions. Rather than beginning with facts and ideas and then moving to applications, collaborative learning activities frequently begin with problems, for which students must marshal pertinent facts and ideas. Instead of being distant observers of questions and answers, or problems and solutions, students become immediate practitioners. Rich contexts challenge students to practice and develop higher order reasoning and problem-solving skills.

2.3. Learners are Diverse

Our students bring multiple perspectives to the classroom-diverse backgrounds, learning styles, experiences, and aspirations. As teachers, we can no longer assume a one-size-fits-all approach. When students work together

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on their learning in class, we get a direct and immediate sense of how they are learning, and what experiences and ideas they bring to their work. The diverse perspectives that emerge in collaborative 'activities are clarifying but not just for us. They are illuminating for our students as well.

2.4. Learning is Inherently Social

As Jeff Golub points out, "Collaborative learning has as its main feature a structure that allows for student talk: students are supposed to talk with each other....and it is in this talking that much of the learning occurs." (Golub, 1988) Collaborative learning produces intellectual synergy of many minds coming to bear on a problem, and the social stimulation of mutual engagement in a common endeavor. This mutual exploration, meaning-making, and feedback often leads to better understanding on the part of students, and to the creation of new understandings for all of us.

3. Goals for Education

While we use collaborative learning because we believe it helps students learn more effectively, many of us also place a high premium on teaching strategies that go beyond mere mastery of content and ideas. We believe collaborative learning promotes a larger educational agenda, one that encompasses several intertwined rationales.

3.1. Involvement

Calls to involve students more actively in their learning are coming from virtually every quarter of higher education (Astin, 1985; Bonwell and Eison, 1991; Kuh, 1990; Study Group on the Conditions of Excellence in Higher Education, 1984). Involvement in learning, involvement with other students, and involvement with faculty are factors that make an overwhelming difference in student retention and success in college. By its very nature, collaborative learning is both socially and intellectually involving. It invites students to build closer connections to other students, their faculty, their courses and their learning.

3.2. Cooperation and Teamwork

In collaborative endeavors, students inevitably encounter difference, and must grapple with recognizing and working with it. Building the capacities for tolerating or resolving differences, for building agreement that honors all the voices in a group, for caring how others are doing these abilities are crucial aspects of living in a community. Too often the development of these values and skills is relegated to the "Student Life" side of the campus. Cultivation of teamwork, community-building, and leadership skills are legitimate and valuable classroom goals, not just extracurricular ones.

3.3. Civic Responsibility

If democracy is to endure in any meaningful way, our educational system must foster habits of participation in and responsibility to the larger community. Collaborative learning encourages students to acquire an active voice in shaping their ideas and values and a sensitive ear in hearing others. Dialogue, deliberation, and consensus-building out of differences are strong threads in the fabric of collaborative learning, and in civic life as well.

4. Collaborative Learning Approaches

Collaborative learning covers a broad territory of approaches with wide variability in the amount of in-class or out-of-class time built around group work. Collaborative activities can range from classroom discussions interspersed with short lectures, through entire class periods, to study on research teams that last a whole term or year. The goals and processes of collaborative activities also vary widely. Some faculty members design small group work around specific sequential steps, or tightly structured tasks. Others prefer a more spontaneous agenda developing out of student interests or questions. In some collaborative learning settings, the students' task is to create a clearly delineated product; in others, the task is not to produce a product, but rather to participate in a process, an exercise of responding to each other's work or engaging in analysis and meaning-making.

5. Cooperative Learning

Cooperative learning represents the most carefully structured end of the collaborative learning continuum. Defined as "the instructional use of small groups so that students work together to maximize their own and each other's learning" (Johnson *et al.* 1990), cooperative learning is based on the social interdependence theories of Kurt Lewin and Morton Deutsch (Deutsch, 1949; Lewin, 1935). These theories and associated research explore the influence of the structure of social interdependence on individual interaction within a given situa-

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tion which, in turn, affects the outcomes of that interaction (Johnson and Johnson, 1989). Pioneers in cooperative learning, David and Roger Johnson at the University of Minnesota, Robert Slavin at Johns Hopkins University, and Elizabeth Cohen at Stanford, have devoted years of detailed research and analysis to clarify the conditions under which cooperative, competitive, or individualized goal structures affect or increase student achievement, psychological adjustment, self-esteem, and social skills.

In cooperative learning, the development of interpersonal skills is as important as the learning itself. The development of social skills in group work-learning to co-operate-is key to high quality group work. Many cooperative learning tasks are put to students with both academic objectives and social skills objectives. Many of the strategies involve assigning roles within each small group (such as recorder, participation encourager, summarizer) to ensure the positive interdependence of group participants and to enable students to practice different teamwork skills. Built into cooperative learning work is regular "group processing," a "debriefing" time where students reflect on how they are doing in order to learn how to become more effective in group learning settings (Johnson, Johnson and Holubec, 1990).

6. Problem-Centered Instruction

Problem-centered instruction, widely used in professional education, frequently is built around collaborative learning strategies. Many of these spring from common roots, especially the work of John Dewey in the early part of this century. Dewey endorsed discussion-based teaching and believed strongly in the importance of giving students direct experiential encounters with real-world problems. Guided Design, cases, and simulations are all forms of problem-centered instruction, which immerse students in complex problems that they must analyze and work through together. These approaches develop problem-solving abilities, understanding of complex relationships, and decision-making in the face of uncertainty. While problem-solving has long been a focus of professional education, it is increasingly regarded as an important aspect of the liberal arts as well.

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6.1. Guided Design

Guided Design is the most carefully structured approach to problem-centered instruction. The approach asks stu-dents, working in small groups, to practice decision-making in sequenced tasks, with detailed feed-back at every step. Developed in the late 1960's in the engineering program at West Virginia University, the Guided Design approach has since been adopted in many disciplines and professional programs, most notably in engineering, nursing and pharmacy, but in **many** liberal arts and sciences courses as well (Borchardt, 1984; Day *et al*, 1984; deTornay and Thompson, 1987; Miller, 1981; Roemer, 1981; Vogt *et al*., 1992).

6.2. Cases

Case studies have long been a staple for teaching and learning in the professions, particularly in the fields of business, law and education, and they are now being used in many other disciplines as well (Christensen and Hanson 1987). A case is a story or narrative of a real life situation that sets up a problem or unresolved tension for the students to analyze and resolve. The use of cases does not necessarily imply collaborative learning or small seminar discussion. However, case method teaching frequently asks small groups of students to tackle cases in class or in study group sessions.

6.3. Problem-Centered Instruction in Medical Education.

Problem-centered instruction has also emerged in recent decades in the field of medical education. This work began in England, then spread to Canada and ultimately to the U. S. M.L.J. Abercrombie's research in England in the 1950's made a compelling case for discussion methods of teaching, contending that when people work in teams, they make more valid judgments than when working alone. This pioneering research had a profound impact on collaborative learning in medical education both in England and North America (Abercrombie, 1961, 1970). McMaster University in Canada was one of the early leaders in problem-centered medical education (Barrows and Tamblyn, 1980), followed by Western Reserve University, the University of New Mexico, and others. In 1985, the Harvard Medical School adopted a problem-based curriculum entitled "New Pathways" that has garnered national attention.

6.4. Simulations

Simulations are complex, structured role-playing situations that simulate real experiences. Most simulations ask students, working individually or in teams, to play the

roles of opposing stakeholders in a problematic situation or an unfolding drama. Taking on the values and acting the part of a stakeholder usually gets students emotionally invested in the situation. The key aspect of simulations, though, is that of perspective-taking, both during the simulation exercise and afterwards. Following the simulation, there is usually a lengthy discussion where students reflect on the simulation and explore their own actions and those of others. This is where important concepts and lessons emerge. There are **now** a large number of simulations or educational games, as they are sometimes called, relating to many disciplinary areas (Abt, 1987; Bratley, 1987).

7. Writing Groups

Both in theory and practice, the most concentrated effort in undergraduate collaborative learning has focused on the teaching of writing. The writing group approach, (known variously as peer response groups, class criticism, or helping circles) has transformed thousands of college writing classes. Through the spread of writing-across-the-curriculum initiatives, writing groups increasingly are appearing in other courses as well.

Peer writing involves students working in small groups at every stage of the writing process. Many writing groups begin as composing groups: they formulate ideas, clarify their positions, test an argument or focus a thesis statement before committing it to paper. This shared composing challenges students to think through their ideas out loud, to hear what they "sound like," so they will know "what to say" in writing. Writing groups also serve as peer response groups. Students exchange their written drafts of papers and get feedback on them either orally or in writing. This is a challenging process, one that requires students to read and listen to fellow students' writing with insight, and to make useful suggestions for improvement. Word processors have helped peer writing enormously; in many writing labs, students share their drafts and revise them right on the screens.

8. Peer Teaching

With its roots in our one-room schoolhouse tradition, the process of students teaching their fellow students is probably the oldest form of collaborative learning in American education. In recent decades, however, peer teaching approaches have proliferated in higher education, under many names and structures (Whitman, 1988). The following examples represent three of the most successful and widely adapted peer teaching models.

8.1. Supplemental Instruction

The Supplemental Instruction approach is an undergraduate teaching assistant model developed by Deanna Martin at the University of Missouri-Kansas City. It has been adopted at hundreds of colleges in the United States and abroad. This urban campus recognized the need to offer tutoring help to students, but budgetary constraints made one-to-one tutoring too expensive. Its search for an alternative approach led to "Supplemental Instruction." This approach focused not on "at risk students," but rather on "at risk classes," entry-level classes in health sciences, and later in general arts and sciences classes, where more than 30 per cent of the students were either withdrawing or failing. The university invites advanced undergraduates who have done well in those classes to become "SI leaders." These students are paid to attend the class, and to convene Supplemental Instruction sessions at least three times a week at hours convenient to students in the class. (Blanc, DeBuhr and Martin, 1980).

8.2. Writing Fellows

The Writing Fellows approach, pioneered by Tori Haring-Smith at Brown University, is a peer teaching approach somewhat parallel to Supplemental Instruction. The writing fellows are upper-division students who are strong writers. After extensive training, these students are deployed to an undergraduate class (generally in the discipline of their major) where they read and respond to the papers of all the students. Haring-Smith calls this a "bottom-up approach" to sustaining writing-across-thecurriculum initiatives, particularly in large classes where many faculty flag at assigning writing because there are simply too many papers to which to respond. Over 50 colleges and universities have created Writing Fellows Programs.

8.3. Mathematics Workshops

A third peer teaching approach that spread rapidly in the late 1980's is the intensive mathematics workshops program developed by Uri Treisman while he was at the University of California at Berkeley. Treisman wanted to address the drawbacks of traditional tutoring models-particularly those geared to minority students in academic difficulty. Finding that study groups made a difference in student success, he created a co-peer teaching approach called the Professional Development Program. The program assumes the culture of an honors program rather than a remedial program. Graduate instructors (usually

doctoral candidates) lead math workshops built around small group problem-solving, with an explicit emphasis on peer teaching. These workshops supplement the regular lecture and discussion sections of mathematics courses. This intensive small group workshop approach, which emphasizes developing strength rather than remediating weakness, and peer collaboration rather than solo competition, completely reversed the prevailing patterns of failure by Hispanic and African American students in calculus classes at Berkeley (Treisman, 1985). This intensive math workshop approach has since spread widely in the mathematics community in high schools, as well as in both two- and four-year colleges.

Writing Fellows... are a "bottom-up" approach to sustaining writing-across-the curriculum initiatives...

9. Discussion Groups and Seminars

The terms *discussion group* and *seminar* refer to a broad array of teaching approaches. In college settings we usually think of discussions as processes, both formal and informal, that encourage student dialogue with teachers and with each other.

All the approaches we have described above involve discussion. Most, however have distinct protocols, goals, or structures framing the activity. What we are describing here-more open-ended discussion or seminars-puts the onus *on* the teacher or the students to pose questions and build a conversation in the context of the topic at hand. There is enormous variability, then, in terms of who sets the agenda, who organizes and monitors the discussion, and who evaluates what. Some discussions or seminars may be heavily teacher-directed, others much more student-centered. There are myriad possibilities for discussions, and many good resources on strategies exist (Christensen *et al*.,1991; Eble, 1976; McKeachie, 1986; Neff and Weimer, 1989).

10. Learning Communities

Collaborative learning practitioners would say that all collaborative learning is about building learning communities. However, we use the term *learning community* here in a broader but more specific sense, in terms of intentional reconfiguration of the curriculum. In the past 15 years, a number of colleges have recognized that deep-seated structural factors weaken the quality of undergraduate learning and inhibit the development of community. These schools have attacked the problem directly by developing learning communities, a "pur-

poseful restructuring of the curriculum to link together courses so that students find greater coherence in what they are learning and increased interaction with faculty and fellow students" (Gabelnick, MacGregor, Matthews, and Smith, 1990). As such, learning communities are a delivery system and a facilitating structure for the practice of collaborative learning.

Learning community curriculum structures vary from campus to campus. They can serve many different purposes, but have two common intentions. They attempt to provide intellectual coherence for students by linking classes together and building relationships between subject matter, or by teaching a skill (e.g., writing or speaking) in the context of a discipline. Second, they aim to build both academic and social community for students by enrolling them together in a large block of course work. Learning communities directly confront multiple problems plaguing under-graduate education: the fragmentation of general education classes, isolation of students (especially on large campuses or commuter schools), lack of meaningful connection- building between classes; the need for greater intellectual interaction between students and faculty; and lack of sustained opportunities for faculty development.

By altering the curricular structure to provide larger units of study, learning communities frequently provide more time and space for collaborative learning and other more complicated educational approaches. Small group workshops and book seminars are staples of most learning communities. Peer writing groups and team projects associated with labs and field work are also fairly common. Study groups emerge in learning communities, both intentionally and spontaneously. These programs provide a unique social and intellectual glue for students that results in high rates of student retention, increased student achievement and more complex intellectual development (MacGregor, 1991).

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11. Collaborative Learning: Challenges and Opportunities

Creating a collaborative classroom can be a wonderfully rewarding opportunity but it is also full of challenges and dilemmas. Few of us experienced collaborative work in our own undergraduate settings, and much of our graduate school training reinforced the teacher-centered, lecture-driven model of college teaching. For each of us,

stepping out of the center and engaging students in group activity is hard work, especially at first.

Designing group work requires a demanding yet important rethinking of our syllabus, in terms of course content and time allocation. If some (or a great deal) of the classroom time is considered an important social space for developing understandings about course material, or if some of the out-of-class time is devoted to study groups or group projects, how should we design the rest of the class time (lectures, assignments, examinations)? How do we ensure students are learning and mastering key skills and ideas in the course, while at the same time addressing all the material of the course? Teaching in collaborative settings puts front and center the tension between the **process** of student learning and **content** coverage.

As we become more involved in using collaborative learning, we discover what radical questions it raises. Collaborative learning goes to the roots of long-held assumptions about teaching and learning. Classroom roles change: both teachers and students take on more complex roles and responsibilities. (Finkel and Monk, 1983; MacGregor, 1990). The classroom is no longer solo teacher and individual students- it becomes more an interdependent community with all the joys and tensions and difficulties that attend all communities. This degree of involvement often questions and reshapes assumed power relationships between teachers and students, (and between students and students), a process that at first can be confusing and disorienting (Romer and Whipple, 1990).

Not only is course content reshaped, so are our definitions of student competence. Because the public nature of group work makes demonstration of student learning so continuous, collaborative learning both complicates and enriches the evaluation process.

Challenges to collaborative learning at the classroom level are compounded by the traditional structures and culture of the academy, which continue to perpetuate the teacher-centered, transmission-of-information model of teaching and learning. The political economy of the academy is set up to front load the curriculum with large lower division classes in rooms immutably arranged for lectures, usually in classes limited to fifty-minute "hours." Student-student interaction; extended, careful examination of ideas; the hearing-out of multiple perspectives; the development of an intellectual community - all these are hard to accomplish under these constraints.

The lecture-centered model is reinforced (both subtly and blatantly) by institutional reward systems that favor limited engagement in teaching, and give greater recognition to research. Achievement for teachers and students alike is assumed to be a scarce honor, which one works for alone, in competition with peers. This assumption of scarcity is the platform for norm-referenced grading, or "grading on the curve," a procedure that enforces distance between students and corrodes the trust on which collaborative learning is built.

Moreover, our definitions of our selves as teachers, as keepers and dispensers of disciplinary expertise, are still very much bound up in the lecture podium. For example, a colleague recently told us a poignant story about his dean coming to observe his teaching. The dean looked into the room where students were avidly engaged in small group work.

Turning to leave, the dean said to our colleague, "Oh, you're doing groups today. Ill come back when you're teaching." We have a long way to go.

What really has propelled us and our colleagues into collaborative classrooms is the desire to motivate students by getting them more actively engaged. Nonetheless, wanting to be a facilitator of collaborative learning and being good at it are very different things. As with all kinds of teaching, designing and guiding group work takes time to learn and practice. And for students, learning to learn well in groups doesn't happen overnight. Most teachers start with modest efforts. Many work with colleagues, designing, trying and observing each other's approaches.

At their best, collaborative classrooms stimulate both students and teachers. In the most authentic of ways, the collaborative learning process models what it means to question, learn and understand in concert with others. Learning collaboratively demands responsibility, persistence and sensitivity, but the result can be a community of learners in which everyone is welcome to join, participate and grow.

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