

I *In undergraduate settings, one constellation of strategies for creating student engagement and increasing student learning involves small-group inquiry and reflection.*

The Argument for Making Large Classes Seem Small

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Maria Bravo is hurrying to Dr. Robert Webking's Introduction to Politics class this warm October morning. She is among 560 students taking this fall 1998 class at the University of Texas, El Paso. She arrives a few minutes early and is given a handheld computer after presenting her student identification card to the teaching assistant.

Webking often begins the class with a short, multiple-choice quiz on the assigned reading. On this day, however, he begins by lecturing on the day's topic: the concept of freedom as articulated by Plato. After about fifteen minutes, he shows a multiple-choice question on a large overhead screen asking students whether freedom should be absolute for all human beings or whether it should be dependent on several extenuating circumstances. The class is given a minute to reflect on the question, and Maria then enters her response on the computer. Two students sitting beside her use the computer to enter their responses. Students throughout the classroom are doing the same thing, and within a minute or two Webking has hundreds of responses. These answers are tallied by the computer and shown on the screen. As Webking expects based on prior semesters' experiences, most students indicate that freedom should be absolute for all human beings. He then displays a brief cartoon of an infant crawling toward a can of Drano that is in a cupboard under a sink. The class, 65 percent of whom had chosen the absolute-freedom response, chuckle ruefully and buzz among themselves. Webking invites the students to discuss briefly, in pairs or trios, the question just posed and to determine whether they would like to change their answers. After a minute or so, he continues lecturing for another fifteen minutes before posing another question to the students.

Webking notes that this class, composed of 70 percent Latino students (the all-campus average) has about 80 percent of the students in attendance. Before he initiated this active-learning methodology using Classtalk—the computer instructional system just described—the student attendance was about 50 percent. Webking also reports that his students' exam scores are higher since he initiated his cooperative-learning procedures and that his teaching evaluations are overwhelmingly positive. Time on task (giving full attention to the lecture or activity) has also improved, even for students sitting in the last row.

Few professors teaching large classes have the state-of-the-art technology described in this vignette, which offers a slightly modified version of an actual observation of Dr. Robert Webking's class (the student name is fictitious). However, we believe that the principles of effective teaching and learning depicted here can be substantially incorporated in most large-class settings, whatever the instructional approach or physical setting.

It is safe to say that in undergraduate settings large classes are prevalent and will remain so in the foreseeable future. The pressure is on at many schools to increase class sizes further. Lecture is the prevailing teaching strategy in these classes, and in these settings students are not usually challenged to engage in much thinking or reflecting on course material. This large-class–lecture-centered approach seems to be inviting increased degrees of student disengagement. Nevertheless, we are not calling for the total abandonment of the lecture as a teaching strategy. Rather, we would like to make this approach to teaching more meaningful and engaging for students, especially in large-class settings. One constellation of strategies for creating student engagement and increasing student learning involves small-group inquiry and reflection. Can it happen in large classes? We believe so. Numbers of our colleagues are actively and successfully using these approaches. In the remainder of this chapter, we present a rationale for using small-group approaches to make large classes more engaging and productive for both students and teachers.

Large Classes and Lecture Modes: Prevailing Realities

In undergraduate settings today, large-class environments are prevalent. On many campuses, dozens of classes are regularly enrolled at over fifty students, and many carry enrollments of one hundred, two hundred, and up to six hundred and seven hundred students. The political realities of large universities are structured to have large-enrollment lower-division courses pay for small-enrollment upper-division and graduate classes. This pattern is not likely to disappear in the near future. These classes are often taught entirely in the lecture mode, with tests that often call for low levels of student understanding. Rarely are students asked to process their learning,

unless the class also carries a discussion or quiz section or lab component. Even then, the discussion section is little more than a supplementary or review lecture delivered by a teaching assistant (TA). It is a sad commentary on our universities that the least engaging class sizes and the least involving pedagogy is foisted upon the students at the most pivotal time of their undergraduate careers: when they are beginning college.

The literature on students' responses to large-class learning environments is limited and not encouraging. A study conducted by Carbone and Greenberg (1998) at the University of Maryland in 1994 yielded a general dissatisfaction with the quality of large-class learning experiences. This random sampling of one hundred students revealed what bothered them the most:

- Lack of interaction with faculty members (in and out of class)
- Lack of structure in lectures
- Lack of or poor discussion sections
- Inadequate contact with teaching assistants
- Inadequacy of classroom facilities and environment
- Lack of frequent testing or graded assignments

Only 25 percent of the students agreed with the statement "The size of the class does not affect my ability to learn," whereas 41 percent strongly disagreed and another 15 percent disagreed. In another study of student perceptions of large college classes (Wulff, Nyquist, and Abbott, 1987), students noted a number of problems. They reported that there was lessened individual accountability ("It is easier to do anything you want, sleep, not attend, or lose attention"). They also commented on the impersonal nature of such classes ("No one knows I'm here"), which led to decreased motivation. A third factor associated with large classes was an increase in noise and distractions ("Rude people who come late, leave early, or sit and talk to their buddies"). Wulff, Nyquist, and Abbott conclude, "Foremost among the dimensions of large classes that hindered students' learning was the lack of instructor-student interaction with opportunities for questions and discussions." They assert, "The key seems to lie in finding ways to provide instructor-student interaction in the large-class context" (1987, p. 21).

It is no accident that these large classes are commonly referred to as "large lecture" or "large lecture sections," for faculty members generally teach the way they were taught in these settings—via the lecture. In *Redesigning Higher Education* (1994), Lion Gardiner reported on a 1980 study by Blackburn, Pellino, Boberg, and O'Connell in which 73 to 83 percent of the college teachers surveyed identified the lecture method as their usual instructional strategy. These high percentages were based on data obtained from 1800 faculty members representing a variety of institutions (large and small, public and independent, community colleges and research

universities). Gardiner mentions several other studies whose conclusions are the same. Similar findings have been recently described by Horace Rockwood, the director of the Pennsylvania State University Summer Teaching Academy (personal communication with the authors, Feb. 1999). He polled 450 faculty members in the Pennsylvania State system who attended this academy and found that approximately 80 percent of them use the lecture as their primary instructional method. Rockwood's findings are compelling because these faculty members have strong commitments to teaching, as evidenced by their having enrolled in the weeklong teaching institute.

Are Lectures Effective?

Given that most of the professorate choose lecturing as their primary instructional strategy, what do we know about the efficacy of lectures? The research here is fairly consistent, and the news is not good. Pascarella and Terenzini (1991), McKeachie (1986, 1994, 1999), and others have reviewed the impact of lecturing on a variety of student outcomes. Many of these studies compare the lecture with some other form of instruction, usually a discussion method. In reviewing seventeen such comparative studies, McKeachie (1986) noted that lectures and discussion methods are equally effective in fostering memorization of lower-level factual material but that the lecture method is less effective when measures of long-term knowledge retention, transfer of knowledge to new situations, measures of higher-order thinking, attitude change, and motivation for further learning are assessed. McKeachie's findings are consistent with similar research syntheses conducted by Bligh (1972), Costin (1972), and Pascarella and Terenzini (1991).

In their 1998 cooperative-learning workbook, Johnson, Johnson, and Smith identify additional problems with the lecture approach. They note that the lecturer makes a series of assumptions about learners that may not be justified. These assumptions are that all students are intelligent, educated persons oriented toward auditory learning; need the same information presented orally at the same time and pace, without dialogue with the presenter; have high working-memory capacities; possess the prerequisite knowledge to benefit from the lecture; and have good note-taking skills. How many colleges and universities dependent on large lecture classes make these assumptions? How many have tested them?

One reason for the disappointing results regarding the efficacy of the lecture method may relate to the low time on task associated with lecture techniques. Penner (1984), Verner and Dickson (1967), and others have noted that time on task (paying full attention) with the lecture method is high for the first ten to twenty minutes, then tends to drop until near the end of the lecture, when according to Lloyd, attention picks up in anticipation of the end. Student note-taking thoroughness reflects similar decreases over the course of the lecture (Gardiner, 1994). The literature on retention of course content presented via lecture is even more troubling. Gardiner

reports research that indicated that students retain 42 percent of lecture content when assessed immediately after the presentation; this dropped to 20 percent a week later.

Consistent with these reports of lack of student involvement and retention of information, Kuh, Schuh, and Whitt (1991) reported on a *compact of disengagement* between faculty members and students. In effect, Kuh, Schuh, and Whitt observed, faculty members in large-class environments send the message “You leave me alone and I will leave you alone” (p. 362). Large classes often set up a distance between instructors and students, where more often than not the faculty member does not know the students personally and vice versa. Students feel little sense of responsibility or accountability in class. Many attend irregularly. We often hear that large-lecture attendance dwindles throughout the term and is often down to 30 to 40 percent by the end. And in many larger classes, note-taking services have sprung up as lively businesses through which students buy lecture notes in lieu of attending class. Clearly, students across the nation are sending us signals concerning their disaffection with large classes.

Appropriate and Inappropriate Uses of the Lecture

This is not to say that the lecture is without merit. All four of the editors of this issue of *New Directions* use lectures in the classes they teach, along with other teaching strategies. Appropriate uses of the lecture, according to McKeachie (1999), Cuseo (1998), and Costin (1972) include these:

- To organize, integrate, and update reading materials
- To model problem solving and critical thinking as conducted by an advanced practitioner in the field
- To demonstrate enthusiasm for the subject matter
- To relate course-relevant personal experiences to the students
- To explain and develop complex concepts and ideas introduced in the reading
- To provide context for issues and ideas and information introduced in the reading

Johnson, Johnson, and Smith (1998) add to this list by indicating that lectures may be useful when the teacher needs to integrate information from a large variety of sources, or a number of points of view, in a small amount of time. As McKeachie (1999) noted, lecture preparation can serve as a useful tool for the teacher, requiring him or her to spend time updating, synthesizing, and reflecting on course content.

In contrast, Cuseo (1998) noted that lectures are least appropriate when material is already available and comprehensible in print; when material is of a rote nature that can be more readily processed by the learner in a text or handout; and when course content can be most effectively retained

through direct, personal contact (as in public service projects or cooperative learning).

Theoretical and Empirical Rationale for Using Small Groups

This volume presents a number of small-group approaches that may be used within and as adjuncts to large-class instruction. Each approach has its own history of empirical support, ranging from relatively rich to fairly limited. We believe these strategies are reinforced by a wide range of empirical and theoretical arguments, providing a kind of convergent validity for their power. Some of these are described in this section. Additional sources documenting the power of small-group work are listed in Chapter Six.

Promoting Cognitive Elaboration. In order for students to gain mastery of academic content they need to move it into long-term memory and embed it in their own cognitive structures. For this to happen, they need to actively use the material they are learning and construct their own understanding of it, not simply read about it or hear it in a lecture. Researchers and theorists committed to constructivism, information processing, and cognitive development agree that passive involvement with course content, usually associated with the lecture method, does not provide the kind of deep learning that is needed if students are to master the content so that they can later use it flexibly and powerfully (Vygotsky, 1978; Kurfiss, 1988; Pascarella and Terenzini, 1991; Bruffee, 1993). These researchers and theorists have documented that information presented in lectures must be moved into long-term memory by having the students develop into communities of learners who discuss, debate, and summarize academic content.

Some small-group learning strategies go further than simply asking students to discuss academic concepts and ideas; they actually ask students to teach them to each other. Most people know from experience that a powerful way to learn material at a deep level is to teach it to others. Research conducted by O'Donnell and Dansereau (1992) and Ruhl, Hughes, and Schloss (1987) confirms this notion. The Roman philosopher, Seneca, said it best: *Qui docet discet*: "When you teach, you learn twice" (Whitman, 1988).

Enhancing Critical Thinking. Research and theory associated with critical thinking and developmental psychology support the concept of cognitive elaboration and development described in the previous paragraph. Developmental theorists including Piaget (1952), Vygotsky (1978), Perry (1970), Belenky, Clinchy, Goldberger, and Tarule (1986), and Gilligan (1982) stress the importance of engaging in social interactions, especially with others who are in proximal stages of cognitive development, as a means of fostering more mature ways of thinking about the world. In other words, many students learn best from other students, who can explain new information using language more understandable and less academic than a

professor (this is sometimes called “converting teacher talk into student talk”). Critical-thinking researchers such as Joanne Kurfiss (1988) concur, stressing the importance of the social community of learners as a critical influence in developing higher-order thinking. Steven Brookfield, in his influential book *Developing Critical Thinkers*, noted: “When we develop critical thinkers, helping them form resource networks with others who are involved in this activity may make a crucial difference. Because identifying and challenging assumptions, and exploring alternatives, involve elements of threat and risk taking, the peer support provided by a group of others also trying to do this is a powerful psychological ballast to critical thinking efforts. Where such a network does not already exist, one of the most important tasks of those trying to facilitate critical thinking is to encourage its development” (1987, p. 79).

In his classic work *What Matters in College?* Alexander Astin (1993) provides significant support for the role of peers in fostering critical thinking. Astin assessed which elements of the college experience have the greatest impact on a host of cognitive and affective student outcomes, including measures of critical thinking. His examination of thousands of students and nearly two hundred college experiences indicates that frequency of student-student and student-faculty interactions are the best predictors of positive student outcomes.

Kurfiss (1988) indicates that developing higher-order thinking implies practice in explicitly formulating and justifying thinking, an element common to most small-group instruction described in this volume. Ahlum-Heather and DiVesta (1986) note that when students are required to explain what they do when solving a problem, they perform better on subsequent problem-solving tests. This latter finding is consistent with work by O'Donnell and Dansereau (1992), who found that in the small-group research that they performed, students *doing* the explaining achieved at a higher level on a subsequent task than students *receiving* the explanation.

Recent work in science education by Eric Mazur (1997) at Harvard and Springer, Stanne, and Donovan (1999) at the University of Wisconsin-Madison reinforce the importance of cooperative learning in fostering higher-order thinking skills. Mazur found that having students discuss their ideas with peers by using a classroom assessment technique known as ConcepTests produced significantly higher levels of physics problem solving relative to students exposed to traditional lectures (see the next chapter for more on ConcepTests). Springer and his colleagues performed a meta-analysis of the impact of small-group instruction in science, mathematics, engineering, and technology classes at the college level. In their summary of thirty-nine high-quality studies they found that academic achievement was significantly enhanced by the use of small-group instruction. Higher-order thinking was the measure of achievement used in many of the studies included in their meta-analysis.

Providing Feedback. Most of the strategies described in this volume offer students prompt and descriptive feedback on the quality of their performances. In most lecture formats, however, students have to wait weeks to practice course-related skills or to demonstrate understanding of course content and then receive feedback. For example, an instructor may present course material during week two, not assess understanding on a test or paper until week six, and then present feedback to the students in week eight or nine. Most of the strategies that we describe allow students to practice a skill or demonstrate an understanding and receive immediate feedback from other students, TAs, or faculty members, and the feedback provided is often descriptive and detailed regarding specific strengths and weaknesses.

Walberg (1984) performed a research synthesis of the kinds of educational interventions and procedures that appeared to have the most powerful impact on student outcomes. The most powerful predictor was feedback to students. In their classic report *Seven Principles for Good Practice in Undergraduate Education*, Chickering and Gamson (1987) reinforce the importance of feedback, making it one of their seven principles. Although much of Walberg's work was based on precollegiate populations, Chickering and Gamson's work was based on extensive reviews of the college-teaching literature. Indeed, these researchers and others (for example, Rosenshine and Meister, 1995) report that the model-practice-feedback loop is among the most powerful instructional strategies available to teachers at all levels. This procedure involves having the teacher model the technique, skill, or concept to be taught. Then students are given multiple opportunities to practice the skill or work with the concept soon after modeling takes place. Finally, students are given prompt and descriptive feedback on the quality of their performances.

Promoting Social and Emotional Development. The small-group structures described in this volume not only provide rich experiences that foster achievement and critical thinking but also develop affective dimensions of students, such as sense of community, altruism, self-efficacy, and learner empowerment (Johnson and Johnson, 1989; Abrami, Chambers, Poulsen, De Simone, d'Apollonia, and Howden, 1995; Belenky and others, 1986). Liking for the discipline and commitment to lifelong learning have also been linked with small-group instruction (Cuseo, 1996; Cooper and Robinson, 1999). Many national reports and blue-ribbon commissions have advised greater use of small-group work to foster these outcomes and to teach team skills—skills highly valued by employers and deeply needed in our communities (Cuseo, 1996; Johnson, Johnson, and Smith, 1998). As Katz, Bornholdt, Gaff, Hoffman, Newman, Ratner, and Weingartner (1988, p. 35) noted:

Cooperative learning arrangements allow individual students the opportunity to work with others on a shared task—in pursuit of a common goal. This may help students to develop the types of human relations skills (for example,

active listening, empathy, consensus building, leadership, constructive conflict management and resolution) which will be relevant and transferable to similar social situations they will encounter in their future careers. The importance of modifying our traditional instructional techniques to provide today's college students with the opportunity to become more altruistic and cooperative is underscored by a recent report on higher education published by the Association of American Colleges. Recent descriptions of college students have berated their self-centeredness and even narcissism. Yet our educational institutions encourage many campus practices that make learning a private activity.

Appreciating Diversity. Possibly the most consistent student outcome associated with the use of cooperative learning is tolerance of diversity (Johnson and Johnson, 1989). Cuseo (1996) offered an explanation for this finding based on considerable work in social psychology. He reported research that suggests that intergroup contact under conditions of cooperation decrease racial prejudice and increase interracial tolerance among K-12 students (Slavin, 1980; Aronson, 1978), college students (Worchel, 1979), and workers in industrial organizations (Blake and Mouton, 1979). Cuseo (1990, 1996) also summarized research supporting the positive impact of small-group instruction on student outcome measures for a variety of student populations, including underrepresented racial and ethnic groups, adult and reentry students, commuter students, female students, and international students.

The demographic trends on our campuses indicate that our student bodies are more ethnically diverse than they have ever been, and this will not change. Yet many students report how difficult it is to communicate across the boundaries of difference and how racial tension is a troubling undercurrent on most college campuses (Levine and Cureton, 1998). Perhaps one of the most compelling rationales for small-group learning is to create classroom conditions that enable students to build bridges of communication and learn to work together.

Reducing Student Attrition. Forty percent of students who begin college do not graduate (Terenzini, 1986). This rate is significantly higher for commuter students (Pascarella and Terenzini, 1991) and underrepresented racial and ethnic groups (Ottinger, 1991). Most attrition occurs during the first year of college (Terenzini, 1986). The student attrition findings of Tinto (1993), Pascarella and Terenzini (1991), Astin (1993), and others suggest that a primary predictor of retention in college is student involvement in the communal life of the college. Regrettably, for many part-time, adult, and commuter students, relatively little time is spent in activities traditionally associated with developing community (for example, clubs, teams, fraternal and social organizations, dormitories and other group-living arrangements). For these students, the overwhelming percentage of contact with the college community occurs in the classroom. Whether commuter or residential,

students can build both involvement and important social bonds through collaborative classroom work.

In addition to these key rationales for small-group work, a substantial body of research points to other outcomes associated with small-group learning, including increased self-esteem (Johnson and Johnson, 1989), enhanced psychological health (Johnson and Johnson, 1989), commitment to lifelong learning (Cooper and Robinson, 1999), improved ability to work in teams (Johnson, Johnson, and Smith, 1998), and a number of other cognitive and affective measures. We invite readers to consult the materials listed at the end of Chapter Six for additional documentation of the power of small-group instruction on an array of student outcome measures.

Bill McKeachie, “dean” of researchers in higher education, put it best when he said: “Our survey of teaching methods suggests that . . . if we want students to become more effective in meaningful learning and thinking, they need to spend more time in active, meaningful learning and thinking—not just sitting and passively receiving information” (McKeachie, Pintrich, Yi-Guang, and Smith, 1986, p. 77).

Even if college teachers are in complete agreement with McKeachie, they often associate small-group learning with small-class learning. As we travel the country presenting workshops on small-group learning, a typical response from faculty members is this: “Fine for you, but I teach a class of eighty (or one hundred, or two hundred) where these approaches just aren’t possible.” Many faculty members simply cannot conceive of large classes being anything but a 100 percent lecture-and-test-driven routine. But other strategies *are* possible. Many educational pioneers are working to make large classes small by systematically creating occasions for students to spend more time together in active, meaningful learning and thinking. Furthermore, these teachers are reporting to us how effective these approaches are for student engagement, student motivation, and student comprehension of course material. The next chapters in this volume describe what these pioneers are attempting to do as well as the challenges they face.

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