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Mixed as it might be, educational research suggests that engaged students are more effectively stimulated and fulfilled in the small class. Of course, students can thrive in large classes if discipline, course level, teacher characteristics, goals, methods, assessment strategies, and outcomes work together to inspire and produce significant learning. The small class environment does not by itself necessarily ensure higher level learning, but studies indicate that if faculty and institutions want to promote and support the active learning pedagogies, mentoring, reflection, feedback, and personal relationships that result in deep and lasting learning, then less is more.

A quick browsing of brochures, handbooks, websites, and other available marketing literature for academic programs designed for higher-level learning reveals that one of the most commonly touted advantages of such courses of study is the prevalence of small classes. Advocates of accelerated, enriched, developmental, or differentiated learning rally around the ubiquitous claim that class size is tied to more engaged teaching and enhanced learning opportunities, the kinds of special academic experiences that come from classroom environments that encourage and support closer relationships among students and between professors and students. Smaller classes, especially those taught by challenging, enthusiastic, and skillful instructors, are essential to higher-level education because they allow individualized, constructivist approaches such as active learning, collaborative and cooperative groups, problem- or inquiry-based pedagogies, experiential learning, discussion-centered curricula, and alternative assessment strategies.

Faculty believe intuitively in the power of small classes. We argue for the advantages of smaller enrollments every semester when institutional pressures for efficiency weigh on us, grounding our arguments in the

intellectual mentoring and intimate academic culture made possible by fewer numbers in our courses. In other words, many faculty reason that smaller classes are essential to active engagement, close mentoring, and significant learning.

Aside from faculty, student, and sympathetic administrators' shared anecdotes that affirm the benefits of small classes, what evidence exists that students, ranging from the exceptional to the struggling, learn more or more deeply in courses with limited enrollment? Is smaller necessarily better? Is less really more?

The Debate on Class Size

A review of major investigations and meta-analyses of the correlation between class size and student learning uncovers that, even though the results of such inquiries are mixed, the research, according to Chism (1998), indicates that programs "that use immediate recall of factual information as the measure of success find large classes slightly more effective or at least equally effective" (see the Comparative Measures of Student Learning in Large and Small Classes section). However, as Chism observes, courses of study that privilege "problem-solving, critical thinking, long-term retention, and attitude toward the discipline find small classes more successful" (see the Comparative Measures of Student Learning in Large and Small Classes section). For courses mindfully designed for significant learning, represented by the latter goals and outcomes listed by Chism, the argument for smaller classes can and should be made. Honors programs, for example, commonly argue for small classes, intentionally rallying around active learning pedagogies such as collaborative and cooperative learning; experiential learning; inquiry- and field-based explorations; learning and living communities; and integrative, interdisciplinary curricula that promote the kind of deep, lasting learning described by Chism (see the National Collegiate Honors Council's website for information on honors teaching and learning: www.nchchonors.org). Developmental educators too have long advocated for small classes to create a positive learning environment that students requiring remediation need if they are to be academically successful. Boylan and Saxon (1999), for instance, share thirty years of developmental education research on the National Association for Developmental Education website (www.nade.net). In their study, Boylan and Saxon (1999) emphasize the importance of "small units of instruction" in "mastery learning" as the key to providing remedial students with optimal learning opportunities. To be fair, higher education organizations such as

NCHC and NADE recognize that significant learning can happen in classes of all sizes when pedagogies are adjusted to the learning environment, but they readily concur with Chism's observations about the fit between small classes and their respective missions to promote deep learning for their diverse student populations. They are not alone in their conclusions.

Where do we find data supporting the importance of class size in producing higher-level learning? Much of the research undergirding the argument for small classes has been focused for decades on K–12. The organization called Reduce Class Size Now (www.reduceclasssizenow.org), with connections to the National Education Association (www.nea.org) and other agencies dedicated to primary education, illustrates the pervasiveness of the issue. Such sources look pointedly at the earliest years of school, but some of the information is applicable to higher education, and some of the studies do mention the value of small classes in college-level work.

The K–12 Debate

Finn (1997) asserts that the "debate about class size is not new" (p. 3), traceable even further back than the Babylonian Talmud, fifteen to twenty centuries ago. He adds that the longevity of the issue demonstrates the time-honored "desirability of limiting the number of students working with one teacher" (1997, p. 3). In more modern times, the Health and Education Research Operative Services (HEROS) website (2003) offers an overview of the class size debate, citing, among others, the work of Howard Blake in the mid-1950s, who concluded that "small classes were better" after adjusting his research data for "scientific acceptability." The HEROS site also refers to subsequent studies by Educational Research Service (ERS; www.ers.org), whose findings were more mixed, showing "some support for the hypothesis that smaller classes are related to higher achievement" (2003, 7) but hedging with the caveat that the advantage is more prominent among certain students in selected elementary school disciplines. The HEROS summary of the ERS study adds that because the difference in achievement does not appear significant until class enrollments drop below twenty, with fifteen being the ideal number, reducing class size may be an untenable option that by itself does not guarantee higher student achievement, though it does seem to result in "better teacher morale and job satisfaction" (2003, 11). Such qualified conclusions characterize the controversial literature on class size.

A reasonable starting point in the unsettled deliberations about class size is the set of landmark meta-analyses of Glass and Smith (1978, 1979) and Smith and Glass (1979), whose studies launched a furious exchange

on the topic, concluding unequivocally, according to Ellis (1984, 7), that "a positive correlation can be drawn between smaller classes" and "student achievement, classroom processes, and teacher and student attitudes." Detractors emerged almost immediately; for instance, Hess (1979) and Simpson (1980) countered Glass and Smith's findings with charges that biased data collection, statistical errors, and disregarded variables affected the study. McIntyre and Marion (1989) added that the research on class size is "contradictory and inconclusive" (p. 1) and does not support the financial implications of reduced course enrollments. Financial implications, undoubtedly, appear as a constant concern in the discourse.

In contrast to negative views, many published studies support the thesis that smaller classes promote greater student achievement and faculty engagement. One notable outcome of such studies is that small classes, although surely benefiting students, actually have an even more affirming influence on teachers, whose morale and investment in pedagogical innovation increase, creating in turn a potentially better environment for learning. Finn (1997), Dillon and Kokkelenberg (2002), HEROS (2003), and the educational commentator Bracey (1995), among others, do a good job surveying the history of research literature on class size and underscoring the preponderance of evidence that small classes enhance learning, achievement, and attitudes. All of them mention the massive STAR Class Size Project, a large-scale, comprehensive analysis conducted over several years in Tennessee (www.heros-inc.org/star.htm). The project resulted in a number of conclusions that have grounded the plethora of arguments for small classes since the mid-1980s STAR study. As Dillon and Kokkelenberg (2002) state, the project provided "clear evidence that smaller class sizes improve student performance" (p. 5). However, they hint at some of the same limitations explicitly stated in Finn's report (1997)—most prominently, that the greater gains were made by minority students and other disadvantaged populations of learners and that small classes are most beneficial in primary grades. Such studies have been replicated in Canada, Australia, Britain, the United States, and elsewhere. In the United States, at least "about half the states," according to Finn, have implemented "small-class initiatives for some or all of their school districts" (1997, p. 6), involving sweeping legislation and huge budget allocations.

Class Size at the College and University Level

The confounding contradictions in the research about class size in elementary schools carry over into examinations of the issue in higher education. Among the voices expressing reservations, Williams, Cook,

Quinn, and Jensen (1985) assert that data from a large project that observed student achievement in university classes ranging in enrollment from thirteen to more than a thousand indicate that the importance of class numbers in college is overstated. In their ambitious, research-based study of how colleges affect student learning and overall development, Pascarella and Terenzini (1991) are also guarded in their view of the advantages of small classes. They emphasize a crucial theme later elaborated by McKeachie (1994): small classes, per se, do not necessarily result in more or deeper learning. The key is matching size to teaching practices that take the most advantage of the mentoring potential and opportunity for significant, active, higher-level learning inherent in the well-designed smaller class context. Pascarella and Terenzini put the matter this way: "Class size is not a particularly important factor when the goal of instruction is the acquisition of subject matter knowledge and academic skills. . . . It is probably the case, however, that smaller classes are somewhat more effective than larger ones when the goals of instruction are motivational, attitudinal, or higher-level cognitive processes" (1991, p. 87).

The conclusions about the value of small classes in higher education are made more compelling by adding to the mix the influence of matching innovative, active, creative pedagogies to significant learning and higher-level outcomes (Fink, 2003). McKeachie (1994) best articulates the twist: "If one takes [the] more basic outcomes of retention, problem solving, and attitude differentiation as criteria of learning, the weight of the evidence favors small classes. . . . In general, large classes are simply not as effective as small classes for retention of knowledge, critical thinking, and attitude changes" (pp. 198–201). When he adds that "meta-analyses of research on class size in classes ranging in level from elementary schools to universities. . . tend to support small classes" (p. 198), he is not discounting the effectiveness of large classes in appropriate contexts. In fact, his point is that when the small class model is matched judiciously with particular groups of students and with teachers whose pedagogies synchronize with small class course goals, outcomes, and assessment strategies, the result is the kind of powerful, deep learning that forms the core of enhanced higher-level curricula. In other words, writes McKeachie, "Size and method are almost inextricably intertwined" (p. 197).

A number of other studies of class size at the college and university level pick up McKeachie's message. Chism (1998) says that for simple knowledge transmission, class size is irrelevant, but if discussion, application, and other active learning methodologies are prized, smaller is better.

On the importance of participatory discussion as an anchor pedagogical strategy in successful small classes, McKeachie notes, "Because active thinking is so important to learning and retention of learning, constraints upon oral participation are likely not only to induce passivity but also to be educationally harmful" (1994, p. 199). Chism (1998) too advocates small classes when the methods used rely on discussion, problem solving, critical thinking, reflection, and writing—that is, the kinds of exercises that should predominate in courses designed to go beyond simply dispensing knowledge.

Measuring up to his own title, Follman (1994) studies the "Conundrum of Class Size at the College Level," offering a number of contradictory explorations of the subject. Yet he reveals one significant conclusion within the history of competing studies: "Students in small classes of 15 or fewer did engage in greater use of the higher order thinking processes" (1994, Illustrative, Representative Studies section, 2). His discovery reinforces the importance of small classes in achieving the goals and educational outcomes of enriched curricula and programming for higher-level learning. However, one cautionary remark in Follman's study bears mentioning: "Ancillary but perhaps more important findings were that talk in college classrooms seldom encouraged higher order thinking, and also that most discourse was conducted at the lowest cognitive level" (1994, Illustrative, Representative Studies section, 2). Rather than discrediting small classes, this comment should motivate teachers and students to work diligently and creatively to ensure rigor, challenge, risk, and innovation in not only small classes but classes of all sizes. Again, size and method are intertwined, and one of the other themes emerging from research on class size is that faculty development must inform the design of both small and large classes. Often, shifting from a large, lecture-hall class to a small-class, seminar model requires that faculty rethink teaching and learning philosophies, methodologies, materials, and assessment. Certainly, the same is true of shifting the other way, from small to large classes. Either way, appropriate faculty development is the common denominator for success.

Cuseo (2007) wrote one of the most thorough and critically astute reviews of the literature on class size in higher education. With a mass of seminal, empirical research data, he argues persuasively for the value of small classes for achieving deep learning. He attributes deep learning to teaching strategies grounded in close mentoring, active-learning methodologies, sophisticated discussion, reflective practice, ample feedback, and frequent writing practice. Synthesizing scores of research studies, Cuseo (pp. 2–9) outlines eight consequences of large classes—all

negative—to underscore the critical value of small classes, especially for first-year courses, in achieving significant learning goals and outcomes:

1. Large class size increases faculty reliance on the *lecture* method of instruction.
2. Large classes reduce students' level of *active involvement* in the learning process.
3. Large class size reduces the frequency and quality of instructor *interaction* with and *feedback* to students.
4. Large-class settings reduce students' *depth of thinking* inside the classroom.
5. Large class size limits the breadth and depth of *course objectives, course assignments*, and course-related *learning outside the classroom.*
6. Students' academic *achievement (learning)* and academic *performance (grades)* are lowered in courses with large class size.
7. Students report *less course satisfaction* in large-size classes.
8. Students give *lower overall ratings (evaluations)* for course instruction delivered in large classes.

Ultimately, after carefully exploring much of the vast research on each of the items on his list, Cuseo (2007) declares: "Viewed collectively, the foregoing research findings and policy statements make a relatively strong case that 15 or fewer students represents an optimal class size. It may be that when class size becomes this small, a qualitative shift take [sic] place in the behavior of students and/or the instructor that can result in a sharp jump or spike in positive educational outcomes" (p. 12).

Light's examination (2001) of students' perceptions and experiences in college also draws on the chief insights of McKeachie (1994), Belenky, Clinchy, Goldberger, and Tarule (1986), Brookfield (1987), Meyers (1986), Meyers and Jones (1993), and others who recognize the value of small classes in building strong, critically reflective learning communities and productive environments for greater achievement. Summarizing one of his major findings, Light notes, "Student after student brings up the importance of class size in his or her academic development. Not surprisingly, small-group tutorials, small seminars, and one-to-one supervision are, for many, their capstone experience" (p. 9). Later in his volume, he adds that his extensive project "sends a clear message—that most of the time smaller is better, with stronger student engagement" (p. 45).

In Light's later descriptions (2001) of what constitutes transformative small-class experiences, he implies that they emerge from the powerful

teaching methods listed earlier—the innovative, active, creative pedagogies that are more possible in small classes and essential to tapping the full potential of an intimate classroom. Reduced numbers alone do not create the magic reported by Light's student subjects. Implicit in their appreciative assessments of their rich learning is the students' acknowledgment of the wise choices, innovation, care, and pedagogical skill of an engaged, well-trained teacher in a small seminar or individual mentoring relationship. The "connected classroom" defined by Belenky et al. (1986), the "reflective classroom" mentioned by both Brookfield (1987) and Meyers (1986), the "silence" and active-learning environment envisioned by Meyers and Jones (1993)—all of these are spaces for the kind of applied, integrative, higher-order learning that is admittedly achievable in larger classrooms with proper approaches but more easily activated in smaller, more interactive classes.

Small Classes, Student Ratings, and Grades

Another interesting feature of the literature on small classes is the correlation between student ratings and class size. Generally, student rating data show that students have a higher level of satisfaction in small classes compared to large classes. Cashin (1988), Centra (1977, 2003), Feldman (1984), McKeachie (1994), Seldin (1984), and others agree, although most researchers caution that the association between high ratings and either small or large class size should not be overly emphasized in faculty evaluation. Seldin (1984), for instance, says, "In general, slightly higher ratings are awarded to professors who teach courses that have fewer than fifteen students. . . . [But] it is only prudent. . . to avoid placing heavy weight on comparison of the ratings of professors teaching courses differing greatly in such characteristics" (p. 135).

Cashin (1988) adds that "there is a tendency for smaller classes to receive higher ratings," but the assertion rests on a "weak inverse association" (p. 3).

Centra (1977), on the other hand, factors the crucial dimension of learning into the research on student ratings of small classes. That is, he studies the degree to which student ratings correlate with actual student learning outcomes, contributing to what Cuseo (2007) calls "a substantial body of research indicating that students' course evaluations correlate positively with actual *learning*. . . . In other words, there is evidence that students tend to rate most highly those courses in which they learn the most" (pp. 9–10). The contention seems well supported by Dillon and Kokkelenberg's study (2002) within the limited context of a single, large, highly selective institution. The authors examine the cumulative probability

of grades and grade point averages received in more than 360,000 undergraduate samples from 1996 to 2001. Overwhelmingly, their data reveal that "the null hypothesis that class size does not matter can be rejected" (p. 10). As class size increases beyond twenty, grade performance drops sharply until the size is forty, when results level off and decline more slowly all the way to beyond four hundred in a class. Dillon and Kokkelenberg conclude, "Again, the message is that large classes have a high [sic] probability of lower grades than small classes" (p. 12), an ostensible causal relation that does not bode well for underrepresented, at-risk, and women students, who generally perform worse as class size increases.

Still, looking at the equation of grades, student ratings, class size, and learning from another side (as the authentic assessment and learning-outcomes movements in education have taught us) grades may not necessarily correlate with learning, just as student ratings may not. In fact, Dillon and Kokkelenberg (2002) admit that, despite their discovery of "a link between grades and class size," they hesitate to "conclude that students learn more in smaller classes" even though they firmly submit that "class size has a negative relationship to grades" (pp. 14–15). But if we assume the best in our faculty and our students, perhaps higher grades—especially in well-designed courses for higher-level learning—at least indirectly measure not grade inflation but rather actual learning. In one of the most detailed studies of the issue, Franklin, Theall, and Ludlow (1991) conclude that grade inflation is not the reason for higher grades in small classes; instead, genuine learning and appreciation for good teaching may be. In scrutinizing student ratings results from more than thirteen thousand course sections over a six-year span at a large, urban, private university, the authors write:

> Class size emerged as the single most powerful predictor of grades and ratings for single-course sections, courses, and instructors. The relatively strong inverse correlations between class size and grades in each level of analysis may be the result of differences in grading standards, methods, or philosophy for small sections versus large sections; or a selection bias placing more experienced/higher-achieving students (and, hence, more satisfied) in small, elective, or upper level courses. Similarly, the pattern of inverse associations found between class size and overall instructor ratings at each level of analysis suggest [sic] that the student's lack of satisfaction with the instructor is matched by a lack of achievement in larger sections compared with smaller ones. (p. 4)

Hence, if we reframe the connection between high ratings and small classes as a sign of real learning and effective teaching, instead of bias, then Centra's comment (2003) makes good sense: "Small classes with fewer

than 15 students get higher evaluations than do larger classes, but if students learn more in smaller classes because they allow for more personal attention, then class size is not truly biasing the evaluations" (p. 498). Also convincing is Cohen's powerful evidence (1981) of the correlation between ratings and learning as demonstrated in common examinations across multiple sections of various classes. In short, if we are willing to allow the possibility, if not probability, that good teaching results in deep, meaningful, lasting learning, then the results of such studies further corroborate the position that higher grades and higher ratings feedback constitute additional evidence of the importance of class size in promoting, supporting, and rewarding both effective teaching and enhanced learning.

Benefits of Small Classes and Small Class Strategies

The research on the impact of class size on learning leaves us with a compelling lesson. McKeachie (1994) cites several major studies that suggest "the ablest students are most favorably affected by being taught in small classes" (pp. 198–201). His assertion is one on which honors programs and other accelerated academic courses of study depend for the appropriate resources needed to fulfill their goals. But we also know from Boylan and Saxon's research (1999) on the learning styles, potential, and success of students at developmental and other levels of academic ability that small class strategies, even when applied in a large lecture hall, can enhance the learning of all students. Many scholars (for example, Carbone, 1998; Gibbs & Jenkins, 1992; Heppner, 2007; Michaelsen, Knight, & Fink, 2002; Millis & Cottell, 1998; Nilson, 2007; Stanley & Porter, 2002) provide guidance for using interactive, small-group tactics in large classes to improve students' learning. But such methodologies are most naturally suited to the classroom with reduced numbers and more opportunities for both instructors and students to take advantage of the relational power of teaching and learning.

Other extensive research studies posit that small classes also help strengthen faculty morale while improving students' experiences in the classroom. For instance, Connor and Day (1988, as cited in Delaware State Education Association, 2007) report these positive outcomes of smaller class size in grade schools (though most of the items on their list can apply to higher education as well):

For students

- More individual attention
- Increased time on task

- Increased opportunities to participate
- Improved self-image
- Greater interest and improved attitude toward learning
- Improved attendance

For teachers

- More job satisfaction
- Increased enthusiasm for teaching
- More activities initiated by the teacher, especially enrichment activities; teachers cover more material with students
- Improved class management and curriculum; lessons proceed more smoothly
- Less time spent on discipline
- Better able to assess and monitor student performance

Such benefits of smaller classes stem largely, as stated earlier, from the relational dimension of teaching and learning. As Palmer (1998) reminds us, "Good teachers possess a capacity for connectedness. They are able to weave a complex web of connections among themselves, their subjects, and their students so that students can learn to weave a world for themselves" (p. 11). Knowing students' names, their ambitions, their fears, their triumphs, and their strengths and weaknesses establishes a connection that unlocks potential and real achievement. The small class furnishes ideal ground for such academic growth and transformative relationships.

Small Classes: Less Is More

Earlier, we noted that financial considerations are often the block to widespread adoption of small classes as a model for richer, more active learning in all our institutions, small and large, private and public alike. But reorienting our thinking about the cost of small classes is a shift worth careful consideration. We should recognize that small classes have the considerable impact of giving both faculty and students opportunities to reap the benefits of collaboration, mentoring, active learning, and community building. We should also acknowledge that when institutions multiply the number of larger classes as a presumed handy solution to financial pressures, they miss seeing the high cost of ratcheting up infrastructure needs such as academic skills labs, first-year experiences, peer mentoring programs, supplemental instruction, and other ventures designed to offset the potentially

deleterious effects of large classes on recruitment and retention. In addition, faculty developers can help faculty move large classes away from passive lecture and low-level knowledge acquisition by infusing active, small-group pedagogies. But the cost of such training and retooling is not insignificant. The question is whether small classes and other small-group or individual experiences are merely a financial drain or really an investment with payoffs for faculty, students, programs, and institutions. The business analogy is anathema to educators—rightly so, but sometimes the economic argument is the one that wins the day with institutional leadership and external constituents.

A long history of research, mixed as it might be, suggests that properly engaged students would be more effectively stimulated and fulfilled in the small class. The argument, however, has several provisions. Good students can also thrive in large classes when the variables of discipline, course level, teacher characteristics, goals, methods, assessment, and outcomes work together to inspire and produce significant learning. For example, the work of Mazur (1997) and Miller, Groccia, and Miller (2001) on interactive, peer instruction in large classes offers convincing models of how to activate small-group pedagogies in large classroom settings. Not every student wants or needs a small class environment. Not every course needs to be situated in a small class. Not every discipline requires small classes for all its offerings. Not every instructor is suited for or has the pedagogical skill to succeed in the small class. Yet when the pieces all come together, size makes a difference, and the research on class size, despite a lack of unanimity, lends sufficient credence to faculty intuition that smaller classes, or alternatively small-class methodologies adapted to large-class environments, substantially enhance learning.

As we reflect on the value of small classes in fostering significant, higher-level learning, we must always remember that real student achievement depends on many course components: appropriate pedagogy aligned with the preparation level and learning preferences of students, the expectations and outcomes of the course, class size, and many other important elements of a well-designed course. The role of faculty development in helping instructors design a powerful, productive learning environment in any size class cannot be emphasized enough. Versatile, responsive, engaged instructors can work wonders in small or large classes when they synchronize goals, methods, materials, assessment, and outcomes with size, level, and student learning styles. But if we pay attention to the compelling body of research on the benefits of smaller classes in producing deep, lasting learning, then matching a well-trained teacher with a small class of eager students yields a winning combination.

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