

Report
Class Size Research Committee
June 18, 2015

Summary

The Class Size Research Committee has surveyed the recent academic literature on class size and its impact on student outcomes. The Committee's primary task has been to establish whether there is new research that would justify a full-scale reexamination of Lincoln's 2007 class size policy.

The Committee has reached four broad conclusions:

- New research provides further support for the idea that, all else being equal, small classes are better than large classes.
- A narrow focus on class size does not provide a complete answer to the question of what additional investment will be most productive in boosting the cognitive and non-cognitive skills of the children at the Lincoln Public Schools.
- Gathering more information about how the class size policy has fared *in Lincoln* is critical for informing responsible decisions about class size going forward.
- There are a number of more flexible options for grouping students that should also be considered in making decisions about class size, particularly in the context of a building renovation plan.

The literature has also led the Committee to a number of more specific conclusions:

- The recent research provides further evidence of the long-term beneficial effects of smaller classes.
- The evidence about the beneficial effects of smaller classes is still clearest for grades K-3, although there is also research that supports the idea that smaller classes in grade 4 and beyond can boost student achievement, non-cognitive skills, and long-term outcomes.
- The research continues to indicate that high-needs students benefit the most from smaller classes.
- Some high-quality research provides a compelling picture of the specific ways in which small classes are beneficial for low-achieving students – how they have more and higher-quality interactions with the teacher, and how they maintain higher-levels of on-task behavior.

This was a short-term interim committee convened for the purpose of deciding whether a full review of class size policy is in order. Our conclusion is that we think that further consideration of the class size question is warranted, but that it should be done in a way that is integrated with other highly related questions. **Given these conclusions and the context of the town's plans for school building renovation, the Committee recommends the creation of a new task force that would consider the question of class size more broadly, including both comparing class size to other inputs, investigating the experience of class size reduction in Lincoln, and considering the**

possibilities of more flexible groupings. The results of this task force could lead to either revision of the class size policy or to making changes within the current policy.

In the sections below, we summarize what we learned from the research, the questions unresolved from the research, the nature of our discussions, and our recommendations for next steps.

The Research

- **The recent research provides further evidence of the long-term beneficial effects of smaller classes.** For example, one study used data from Tennessee's class size experiment (Project STAR) to estimate the effect of smaller class sizes (15 students on average vs. 22 students on average) in grades K-3 on long-term attainment outcomes (Dynarski, et al., 2011). The study found that attending a small class increased the probability of attending college by 2.7 percentage points, with stronger effects for black students and students who qualify for free lunch. Attending smaller classes also increased the probability of earning a college degree by 1.6 percentage points. In addition, the study showed a shift of students who had smaller classes towards degrees in higher earning fields such as STEM fields, business, and economics. Similarly another examination of the long-term impacts of STAR found that students in small classes were significantly more likely to attend college, attend a higher-ranked college (based on mean earnings of students), and demonstrate improvement on other outcomes such as having a 401(K) plan (a proxy for having a good job) (Chetty et al., 2011).
- **The evidence about the beneficial effects of smaller classes is still clearest for grades K-3, though there is also research that supports the idea that smaller classes in grade 4 and beyond can boost student achievement, non-cognitive skills, and long-term outcomes.** Because Project STAR and other class size initiatives have focused on the early elementary years, much of the research pertaining to class size has examined effects of smaller classes at these early grade levels. However, a few recent studies have examined effects of smaller class sizes in *upper* elementary and middle grades. Specifically, one study from Sweden found that smaller classes in grades 4 through 6 were beneficial for cognitive test scores (verbal and logical skills) and non-cognitive test scores (an index reflecting students' perceived self-confidence, persistence, self-security, and expectations) at age 13 and for cognitive test scores at ages 16 and 18. These effects did not fade over time (Fredriksson et al., 2011). The authors also found that smaller classes resulted in increased years of completed education and wages from ages 27 to 42. Another study examined effects on non-cognitive skills of small class sizes in grade 8 (Dee and West, 2011). This study indicated that smaller eighth grade classes were associated with improvements in student reports of motivation and self-confidence and teacher reports of student behavior. These types of non-cognitive skills are increasingly considered important for long-term success in college and careers.
- **The research continues to indicate that high-needs students benefit the most from smaller classes.** One of the most dramatic findings of Project STAR was that

high-needs students benefit the most from smaller classes. Recent research provides further support for this idea, though more by showing how smaller classes boost achievement for high-needs populations than by comparing outcomes for different populations. For instance, one analysis of the math achievement of high-needs 3rd-graders (Merritt, et al., 2011) concludes “class size was a significant predictor of achievement for students from low-income families.” Another study of predominantly Latino urban school districts in Texas (Heilig, et al., 2010) finds that “reduction in the student-teacher ratio [which is not the same as class size], controlling for changes in other inputs, was the largest predictor of increases in student achievement.” Another set of recent studies emphasizes the relative benefits of smaller classes for low-achieving or low-effort students. (Babcock and Betts, 2009)

- **Some high-quality research provides a compelling picture of the specific ways in which small classes are beneficial for low-achieving students – how they have more and higher-quality interactions with the teacher, and how they maintain higher-levels of on-task behavior.**

Over the last 15 years or so, econometricians have developed more creative ways of modeling the effects of class sizes on short- and long-term student outcomes. (Gibbons and McNally, 2013) At the same, education researchers have made advances in what some call the ‘process approach’ to class size research, using detailed classroom observations to construct a nuanced picture of the specific effects of class size on student and educator behavior. (Graue and Rauscher, 2009, provides a helpful overview.)

For instance, one set of researchers (Blatchford, Bassett, and Brown, 2008) used the careful recording of ongoing classroom behavior to draw conclusions about the effects of class size on student engagement and on-task behavior, and about the variable effects for high- and low-attaining students. They found that for all groups of students, active engagement with the teacher increases as classes get smaller, but that the total incidence of this behavior is generally low. They also found that the likelihood of on-task behavior increases for low-attaining students in smaller classes, but that high-attaining students are more likely to exhibit on-task behavior in larger classes. (This may suggest further confirmation of the hypothesis that the positive effects of class-size reduction will appear mostly among high-needs students, as above.)

Unresolved Questions

In the ongoing discussion of class size and the district’s strategic priorities, the Class Size Research Committee recommends that the School Committee consider the following questions:

- What have been the effects of class size variation in Lincoln under the current policy? What have teachers’ experiences been in classrooms with more than the recommended number of students? Is there any evidence of variation in student outcomes between smaller and larger classes?

- Would targeted class-size reductions (e.g., for cohorts with a higher incidence of high-needs students, or for grades with less-experienced teachers) be a more effective use of limited resources?
- What other kinds of support could be provided for larger classes? For example, would the opportunity for regular break-out groups allow for more personalized instruction in the context of larger overall class sizes?
- Is there value to maintaining stability in the number of classrooms, even if it sometimes results in more sections than are required by the policy? Does maintaining the same number of classrooms for a given cohort provide a better learning experience for students?
- What are the potential trade-offs between investments in smaller classes and investments in improving teacher quality?
- To the extent that the educational vision includes a move towards flexible learning groups and project-based learning, particularly in the context of school building renovations, should we think about class size differently than we have in the past? Should the school committee investigate models, particularly for grades 4 and 5, in which students have multiple teachers in classes of different sizes rather than one teacher in one class of one size?

The Discussions

We thought it might be helpful to the school committee to share some of the key points of the discussions of this subcommittee. These discussions also helped to inform the below recommendations.

- Our discussions led us to think that the *general* research about class size was of less use than a more specific consideration of class size *in Lincoln*. For example:
 - Much of the class size research focuses on test scores; Lincoln’s educational mission is more broadly focused on helping students’ thrive in a variety of ways; the benefits of class size for this broader set of outcomes is important to Lincoln but is largely not addressed in the literature;
 - One of the major arguments against reducing class size is that hiring more teachers will dilute the quality of the teacher pool; as an advantaged district, Lincoln might not face the same tradeoffs that other districts do in additional teacher hiring;
 - Lincoln, on the whole, has more advantaged students and fewer behavioral problems than many of the districts discussed in the research; thus it may be the case that larger classes are not as problematic in Lincoln as they might be in other districts.

These are simply illustrative considerations; our broader point is that we need to know more about how the class size policy is working here to make effective recommendations.

- We were uncomfortable making recommendations about class size without incorporating it into a broader discussion of spending resources, particularly teacher quality. Some on the committee were adamant that class sizes, particularly in the upper grades, were too large. Others felt that the money could be better spent on improving teacher quality. We were in agreement that these issues should be considered together in a future task force.

- We thought that even the discussion of class size was too narrow if focused only on numbers per grade, and that the questions of flexible grouping of various sorts, should be developed into an integrated plan that is connected to overall academic priorities. We are aware that some leading schools are putting students, particularly upper elementary school students, into a variety of different types of groupings for different purposes, and we thought that Lincoln should investigate these models further as part of its strategic planning. We also thought this discussion should be connected to the discussion of the building renovation.
- We also discussed that not all large classes were created equal; that there might be some large classes that, because of the experience level of the teacher or the chemistry of the students, require some additional support or another section, whereas with other students and teachers a larger class might work well. Given resource constraints, some on the committee felt that a more flexible plan might be a better option.
- On the other hand, some on the committee felt that, given the town's historic commitment to education, it could be possible to persuade the voters that 20 should be the limit for elementary school classes and that the town might be willing to finance such a shift.

The Next Steps

As part of the continuing reconsideration of the class-size policy, the Class Size Research Committee recommends that the School Committee follow up this effort with a task force that considers the question of class size more broadly, including both comparing class size to other inputs, investigating the experience of class size reduction in Lincoln, and considering other options for grouping students. The results of this task force could lead to either revision of the class size policy or to making changes within the current policy.

- Class size reduction is one possible investment in boosting student achievement. It is hard to know if it is an efficient investment unless we know something about the other possible investments. The district is engaged in efforts to improve its program and increase student achievement by increasing teacher collaboration, through professional development, with the use of curriculum specialists, through the refinement of the curriculum, by recruiting talented and experienced educators. Each of these efforts has a cost. We think that it could be valuable to the School Committee and to the school administration to have a task force that would work in parallel to assess the value of Lincoln's various inputs into student achievement. This group could move closer to an answer to the question of the relative efficacy of a reduction in class sizes, it could provide additional input into the budget and strategic planning processes, and it could help to establish whether there is sufficient grounds for making the case to the town that an increase in overall educational spending would have a marked impact on student achievement.

The work of this new task force could also include the following two initiatives, or they could be worth pursuing as independent efforts:

- First, investigate Lincoln's own experience with class-size variation.

Since Lincoln last changed its class-size policy, in 2007, there have been five cohorts that have spent one year each in classrooms with more students than the recommended number (but still less than the maximum). Rather than relying on the general academic literature, the School Committee might be able to develop a better understanding of the experience of class size in Lincoln by looking more deeply at the experience of those cohorts and of the classroom teachers who led the larger classes.

- Assess the effectiveness of Lincoln's investments in improving teacher quality.

The Lincoln district does invest extensively in efforts to improve teacher quality. Can the district start to make any conclusions about the effectiveness of these investments in improving teacher quality? Doing so would allow a better understanding of the relative merits of these investments and the investments in new teachers that would be necessary to lower the class sizes.

- Incorporate discussions of class size into the program planning, both generally and as part of the preparation for any building renovation.

The Town has endorsed the concept of extensive renovations to the school buildings on Ballfield Road, with or without state support. As the planning for these renovations proceeds, the process should incorporate a discussion of optimal class sizes, of other configurations of students that might boost learning, and of other developments of the physical learning spaces that would be conducive to higher student achievement. For the moment, this discussion is about classrooms and classroom teachers, but a renovated building may allow the district to move past this paradigm. It will provide an excellent opportunity for a deeper discussion of how to create the most effective learning communities. It will also be fruitful for the district to continue to pursue these questions regardless of their impact on a building project.

Selected Bibliography

- Aos, S., Miller, M. & Mayfield., J. (2007). Benefits and Costs of K–12 Educational Policies: Evidence-Based Effects of Class Size Reductions and Full- Day Kindergarten. Washington State Institute for Public Policy, Document No. 07-03-2201.
- Aske, D. (2008). The relationship between school characteristics and student performance on Standardized tests in the Denver Metro region. Academy of Educational Leadership: Allied Academies International Conference.
- Babcock, P., & Betts, J.R. (2009). Reduced Class Distinctions: Effort, Ability, and The Education Production Function. *Journal of Urban Economics*, Vol. 65, pp. 314–322.
- Bascia, N. (2010). Reducing Class Size: What do we Know?. Ontario Institute for Studies in Education.
- Blatchford, P., Bassett, P., & Brown, P. (2011). Examining the effect of class size on classroom engagement and Teacher-pupil interaction- Differences in relation to pupil prior attainment and primary vs. secondary schools. *Learning and Instruction*, 21.
- Blatchford, P., Bassett P. & Brown, P. (2008). Do low attaining and younger students benefit most from small classes? Results from a systematic observation study of class size effects on pupil classroom engagement and teacher pupil interaction. AERA Annual Meeting.
- Burkander, P. (2014). The Causal Effect of School Reform: Evidence from California's Quality Education Investment Act. Michigan State University: Ph.D. dissertation.
- Chetty, R., et. al. (2011). How Does your Kindergarten classroom affect your earnings? Evidence from Project Star. *The Quarterly Journal of Economics*, 126:4.
- Chingos, M. & Whitehurst, G. (2011) Class Size: What Research Says and What it Means for State Policy. Brookings Institute.
- Cho, H., Glewwe, P. & Whitler, M. (2012). Do reductions in class size raise students' test scores? Evidence from population variation in Minnesota's elementary schools, *Economics of Education Review*, Vol. 31, Issue 3.
- De Giorgi, G., Pellizzari, M., & Woolston, W. G. (2009). Class size and class heterogeneity. IZA Discussion Papers, No. 4443.
- Dee, T., & West, M. (2011). The Non-Cognitive Returns to Class Size. *Educational Evaluation and Policy Analysis*, 33:23.

- Dynarski, S., Hyman, J., & Schanzenbach, D. W. (2011). Experimental Evidence on the Effect of Childhood Investment on Postsecondary Attainment and Degree Completion. NBER Working Paper.
- Englehart, J. (2011). Why Class Size Effects Cannot Stand Alone: Insights from a Qualitative Exploration. *Learning Environments Research*, v14 n2.
- Folmer-Annevelink, E., et al. (2010). Class Size Effects on the Number and Types of Student-Teacher Interactions in Primary Classrooms. *Journal of Classroom Interaction*, v45 n2.
- Fredriksson, P., Öckert, B. & Oosterbeek, H. (2013). Long-Term Effects of Class Size. *The Quarterly Journal of Economics*, 128 (1).
- Gibbons, S & McNally, S (2013). The Effects of Resources Across School Phases: A Summary of Recent Evidence. Center for Economic Performance Discussion Paper No 1226, London School of Economics and Political Science.
- Graue, E. & Rauscher E. (2009). Researcher Perspectives on Class Size Reduction. *Education Policy Analysis Archives*, v17 n9.
- Graue, E., Rauscher. E. & Sherfinski M. (2009). The Synergy of Class Size Reduction and Classroom Quality. *Elementary School Journal*, v110 n2.
- Harfitt, Gary James. 2013. Why ‘small’ can be better: an exploration of the relationships between class size and pedagogical practices. *Research Papers in Education*, v28 n3.
- Heilig, J.V., Williams, A. & Jez, S.U. (2010). Input and student achievement: An analysis of Latina/o –serving urban elementary schools. *Association of Mexican American Educators (AMAE) Journal*, 48 -58.
- Jepsen, C., & Rivkin, S. (2009). Potential Tradeoff between Teacher Quality and Class Size. *Journal of Human Resources*, 44.1.
- King, J. (2008). Bridging the Achievement Gap: Learning from three charter schools. Ph.D dissertation, Columbia University.
- Lubienski, S. T., et.al. (2008). Achievement Differences and School Type: The Role of School Climate, Teacher Certification, and Instruction. *American Journal of Education*, 115.
- Magnuson, K.A., Ruhm, C. & Waldfogel, J. (2007). The persistence of preschool effects: Do subsequent classroom experiences matter? *Early Childhood Research Quarterly*, 22(1), 18 – 38.
- Malloy, C., Ph.D., & Vital Research, LLC., (2010). Lessons from the Classroom: Initial Success for At-Risk Students. California Teachers Association.
- Malloy, C., Ph.D., & Vital Research, LLC., (2010). Lessons from the Classroom: Initial Success for At-Risk Students. California Teachers Association.

- Merritt, E., et al. (2011). The Contribution of Mathematics Instructional Quality and Class Size to Student Achievement for Third Grade Students from Low Income Families. Society for Research on Educational Effectiveness.
- Roza, M. & and Oujidani, M. (2012). The Opportunity Cost of Smaller Classes: A State-By-State Spending Analysis. Center on Reinventing Public Education.
- Rumberger, R. W. (2011). Dropping Out: Why Students Drop out of High School and What Can Be Done about It. Cambridge, MA: Harvard University Press.
- Schleicher, A. (2015). The State of Education Today. Global Education & Skills Forum, Dubai, March 15.
- Villoutreix, E. (2012). How does class size vary around the world?. OECD: Education Today. Dec. 10.
- Whitehurst, G. & Chingos, M.. (2011). "Class Size: What Research Says and What it Means for State Policy." Brown Center on Education Policy.