

SPOTLIGHT

Boosting Performance Cost-Effectively: Achievement Value Analysis

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he 1983 report A Nation at Risk sounded the alarm about the state of the U.S. educational system and called for reform.¹ Since then, the United States has launched numerous efforts to improve the performance of its K-12 public education system. But despite three decades of effort and investment, the nation has achieved only pockets of excellence and has been unable to demonstrate significant and steady system-wide progress. With districts currently facing mounting fiscal pressures, rising numbers of struggling students, and even higher standards, the ability to improve performance at scale with current approaches seems unlikely.

The critical question, of course, is, why have all these efforts yielded so little success in raising student performance at scale? Attempts to answer this only give rise to more questions. Were all these seemingly promising initiatives inherently flawed? Or were they not implemented with fidelity? If there were pockets of success, what were the keys to that success? And do we know which types of students benefited most or benefited least? Have we at least learned from these efforts so that we can be more successful in the future?



A key challenge to answering these questions is the lack of meaningful data about these efforts. A lack of sufficiently granular information has made it virtually impossible to conduct an analysis of what is working and what is not. Districts are large complex organizations with long histories and established cultures, organizational structures, and processes; in addition, they must comply with a variety of state and federal regulations, grant and program requirements, and collective bargaining agreements, and must answer to a variety of stakeholders. Flexibility in such large, complex organizations is extremely challenging, and therefore new reform initiatives have tended to be layered one on top of the other. For this reason, there has been an inability to accurately capture specific data to reveal how well each intervention works independently of others. In addition, there has been very little tracking of how much each of these efforts truly costs.

To ensure that the U.S. public education sector as a whole improves performance in a systemic, scalable, and sustainable way, DMC is proposing an "Achievement Value Analysis" (AVA) approach be taken. An AVA approach analyzes the amount of academic achievement that is realized relative to the cost, but measures achievement at a highly granular level based on precise student segmentation. Our thinking is inspired by and adapted from the approach proposed for the field of health care by Michael Porter, Robert Kaplan, Elizabeth Teisberg, Thomas Lee, and DMC's Nathan Levenson.² Measuring outcomes, assessing these results by segmented student populations, and tracking the total cost of the effort will allow not only school districts but perhaps the entire education sector to identify, improve, invest in, and replicate the approaches that work best and most cost-effectively. Specific approaches can be deployed and targeted at the segment of students that will benefit most, approaches that work less well can be abandoned, and the impact of every dollar spent can be maximized. \rightarrow

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The Challenge

Despite a variety of reform efforts implemented since the publication of A Nation at Risk, K-12 performance has risen only marginally. The most recent National Assessment of Educational Progress (NAEP), often referred to as the "nation's report card," shows only a gradual improvement in reading and math scores since the test was first administered in 1971, and shows a persistent gap in the performance of black and Hispanic students relative to that of white students.³ Perhaps most concerning is that U.S. students are falling behind students of other nations. In the most recent Program for International Student Assessment (PISA), which compares the academic performance of 15-year-olds across 65 countries, the U.S. ranked significantly below the Organization for Economic Cooperation and Development (OECD) average (Exhibit 1).

These results become even more alarming when viewed in light of the amount of money the United States spends on public education. According to the global management consulting firm McKinsey & Co., the U.S. spends approximately 65% more per point of performance on PISA math results than does the average OECD nation.⁴ Even if one were to discount international comparisons, only half of Americans

are satisfied with the U.S. educational system.⁵ In other words, increased spending has resulted in neither improved performance nor greater satisfaction levels (Exhibit 2).

Several additional factors are anticipated to render performance improvement even more challenging in years to come. The number of students who are likely to require support and instruction is increasing. Between 2000 and 2010, the number of students living in poverty-a segment that often requires additional help-increased 25%. In addition, students identified as English Language Learners increased by 24% to almost five million during this same period (Exhibit 3). While the high-needs student population is increasing, the fiscal picture is growing bleaker. An aging U.S. workforce's higher health care costs and retirement benefits will place growing demands on limited government funds. By one estimate, the United States has a pension benefits gap of more than \$1.5 trillion, and that gap is growing by nearly \$120 billion per year.⁶ The U.S. public education system's traditional reliance on funding increases-which resulted in more than a doubling of public education spending over the past 30 years-will probably be unsustainable.



The Need for Meaningful Data

An Abundance of Data, But Not the Right Data

Reform efforts have placed an increasing focus on obtaining and using data to help inform instructional decisions in the classroom and in the district. While this focus has resulted in a plethora of measures, these measures do not seem to provide the right data to drive improvement. A recent DMC analysis of outcome measures tracked by large urban school districts revealed little agreement on what data needs to be captured, and a substantial variation in the number of measures being tracked; for example, Chicago Public Schools tracked 19 measures whereas San Francisco Unified School District tracked nearly 100 measures (Exhibit 4). Many of the outcome measures do not provide information specific enough to identify strategies that are raising achievement or give insights on how to improve instructional practice.

An examination of the type of data districts collect reveals a commonality-the data is, for the most part, tracked at an aggregated level. Standardized test scores are aggregated by district, grade, school, and sometimes by classroom. Many of the results are derived from compliance-driven reports such as the "State Accountability Data Report." Given these reporting methods, it is virtually impossible to determine which actions led to higher achievement and which did not. Was the improvement a result of a different population of students? Or was the schedule changed so that many more hours are now devoted to reading than before? Even in districts that use stu-

dent-level data, the outcome measures are not tracked at a level of detail that enables other districts to reliably examine the results and seek to replicate it.

For outcome data to be useful in improving practice, it needs to be tied to the specific educational interventions administered and to the specific population segments targeted. We all know that good teachers intuitively make ad-

EXHIBIT 2: U.S. SATISFACTION WITH EDUCATION VS. SPENDING 1999–2009



EDUCATION, "DIGEST OF EDUCATION STATISTICS 2011.

EXHIBIT 3: SELECT STUDENT POPULATION TRENDS GROWTH FROM 2000–2010



justments and differentiate instruction based on student needs. But school districts fail to capture these same factors when they track student outcomes. On one end of the spectrum, students in general education are assumed to all have fairly similar needs, with very little differentiation in the way instruction is delivered and results are tracked. On the other end of the spectrum, students in special education are assumed to have needs very different from one another. Individualized Education Plans (IEPs) Capturing the appropriate set of outcome measures could allow for a positive, self-reinforcing, and virtuous cycle of replication, experimentation, and improvement.

> require an almost endless combination of interventions, with few standardized protocols or approaches for addressing similar disabilities.

> In reality, there are many different types of factors that play into each student's educational needs. Most districts consider socioeconomic status and race, but factors such as academic history, general attitude toward school, and family background influence outcomes as well. For example, in a remedial math class for general education students, there is no formal consideration of the students' academic history in math, type of skill gap (e.g., numeracy or fractions), reading ability, previous math interventions, family situation, or general attitude toward school.

Because such factors are not categorized and tracked, it becomes easy for members of one school or district to shrug off the successful results of another. "Yes, that school saw math scores rise for students with special needs, but we have more severely disabled students, and more of our children live in poverty." Even within the same school, it is almost impossible to disentangle and compare results of a recent innovation with other methods that are already in place. Capturing the appropriate set of outcome measures could allow for a positive, self-reinforcing, and virtuous cycle of replication, experimentation, and improvement.

The Need to Track Costs

There is another significant factor that has stymied a more systemic and sustainable improvement in the performance of the U.S. education system. While school districts diligently account for all revenue and spending and meet various complex compliance and reporting requirements, many districts lack a clear and consistent methodology to capture and allocate total costs associated with specific interventions. Like most complex businesses, school districts build budgets on different levels: first, at the school level, and second, at the central office level. Thus, aggregating the costs for any specific effort can turn into a complex accounting exercise. The total amount of dollars directly budgeted and spent at the school level varies greatly, often around 40% to 50% of the total district-wide budget. School budgets usually include direct instructional staff (e.g., teachers)

and aides) and supplies. Central office budgets are more complex. They typically include centralized expense items such as expenses related to the superintendent's office, transportation, curriculum, finance, operations, etc., but they also include line-items for some services directly consumed at the school level. It is not unusual, for instance, for school districts to centrally budget special education therapists, ELL programming, or principals' and assistant principals' salaries.



As a result of these structures, tracking the total fees associated with any single program is nearly impossible. For example, schools cannot easily capture the cost of a specific reading program because they cannot draw together data on the cost of textbooks, the direct and indirect costs of professional development, the total cost of the teachers, the cost of coaching, etc. Departmental budgeting may be the convention, but it does not allow school leaders to track the costs of individual programs, much less develop actionable insights on the cost-effectiveness of various programs, strategies, and effortsthe very things they must manage and choose between.





Further complicating the tracking of costs is the fact that most districts have multiple sources of funding with varying levels of constraint. Roughly 10% to 20% of revenues flow in as categorical funds (e.g., Title I), which must be used for specified purposes or student groups based on socioeconomic level. These funds impose strict compliance requirements that demand specific accounting and paperwork. Due to their complexity, meeting the paperwork and compliance requirements often takes priority over capturing the effectiveness with which the funds were deployed.

Ultimately, not capturing and comprehending total true costs has led to a number of unintended consequences. Chief among them is that districts have cultivated a focus on results regardless of the cost required. Because no one knows exactly how much a program costs, school leaders cannot evaluate the merits of similar interventions relative to the resources expended. As a result, programs of equal effectiveness but radically greater costs may be unnecessarily utilized. Given the fiscal pressures districts are experiencing, discovering more cost-effective means of getting results for students will prove critical.

Taking an AVA (Achievement Value Analysis) Approach

One way to ensure systemic, scalable, and sustained improvements within U.S. public education is to place a greater emphasis on identifying, replicating, and improving interventions that work for specific student segments most cost-effectively. Toward this end, DMC has developed the AVA approach to allow districts to measure and compare results, focus on the efforts that have the highest effectiveness, and ultimately create a virtuous cycle of innovation and improvement for the entire sector.

There are three key steps to applying this AVA approach. The first step is to segment the student population—that is, to identify students by their educational needs and relevant attributes. The second step is to measure outcomes based on the specific educational skills being taught rather than based on aggregated skills. The third step is to capture costs fully and accurately (Exhibit 5). This approach allows the impact of each intervention per dollar spent to be calibrated and compared with the impact of other approaches. In this way, schools will focus on the activities and interventions that produce the most cost-effective results and thus allow for better allocation of precious resources of time, effort, and funds, while providing opportunities to invest in new approaches.

1) Segmenting and identifying students by their educational needs

Establishing an appropriate level of segmentation is fundamental to better understanding current practices and making appropriate selections for the future. Porter points out that in medicine, patients who enter the doctor's office with cancer are not all treated the same.⁷ The type of cancer, the stage of the disease, and the sites of metastases are considered along with a host of other factors such as previous treatments, age, general health, attitude, and social supports. These many factors are taken into account in selecting an intervention. In education, a similar segmentation approach needs to be applied. Rather than classifying and tracking students merely by race, income, or their status in general or special education, one could begin to compile other relevant key attributes or root causes of each student's challenges, such as academic history, specific skill gaps (e.g., numeracy vs. fractions), proficiency in foundational skills such as reading (even for math remediation), general attitude toward school, as well as socioeconomic and family situation. For example, in a class of middle school students who all need remediation (as identified by their standardized math scores), the root causes of why they need help may vary greatly. One student may have difficulty with a certain math concept such as fractions, while another student may be very bright but may have had poor teachers in prior years and therefore lacks a solid math foundation. Yet another student may have problems at home that lead him or her to tune out at school in general. Each of these students requires a very different approach to overcome his or her math deficiency. Indeed, an excellent teacher almost instinctively practices this level of personalization and instructional tailoring every day, and often knows which type of approach or intervention might prove more effective. By segmenting the student population according to educational need and relevant attributes, we can track results in a manner that will enable appropriate comparisons between interventions and their effectiveness in addressing specific student needs.



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2) Measuring outcomes based on the specific educational skills being taught and the duration needed to achieve them

Once students have been sorted by their educational needs, the next step is to measure and track the outcomes achieved for each distinct segment of students. Currently, results are often aggregated by school or by classroom. For example, schools will report that 85% of their third graders have achieved at least a proficient level of reading for their grade. Since the classroom is a group of students with various needs, these aggregated results have limited usefulness and are typically not actionable enough. Even if individual student outcomes are tracked

and measured, they are not segmented by students' educational need or by the interventions applied to them. For outcomes to be most useful, the results need to combine student level by segment and by the intervention applied.

In addition, it would be far more useful to fix the educational outcomes being pursued and measure the time to accomplish that goal for each student segment. A school district will typically use a school year as a fixed point with fixed benchmarks, and report that a student has made six months of growth. Ideally, this approach would be flipped: in other words, the educational outcomes being pursued would be fixed, and the time to accomplish that goal would be the variable. Teachers would define a specific educational outcome (e.g., proficiently perform math at an eighth-grade level) and then measure the duration required

to achieve that goal (which might take longer than 12 months). By fixing the outcome and segmenting students by their educational needs and key attributes, schools will record the different amounts of time and instructional interventions required for students to achieve the goal. Some students will likely reach milestones before the year is up, while others may take longer. It is also important to note that duration does not measure the total number of instructional hours but, rather, the time elapsed. Thus, it is possible for an equal amount of instruction to be given over a different amount of time. The difference in duration should be captured because it is an essential component of evaluating performance. Here is a hypothetical health care example that highlights the importance of analyzing duration. Suppose identical twins enter the hospital requiring exactly the same procedure. One opts for the laparoscopic procedure, and will need one week to heal completely, while the other opts for a more traditional surgery and will need two weeks to heal completely. Suppose that the cost and pain suffered by the twins are exactly the same. In evaluating the performance of these two procedures, the amount of time it takes to achieve a full recovery is an important difference.

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By measuring a fixed outcome and the duration required to achieve it, different approaches can be created to see whether the same results can be achieved in a shorter time period and/ or with less effort. By fixing the educational goal to be achieved and measuring the duration to achieve it, there is a greater like-lihood of achieving systemic improvements.

3) Capturing costs fully and accurately

Because public schools are operating in an era of declining resources and increasing needs, the total cost of interventions is an important factor in selecting approaches that could lead to systemic and sustainable performance improvements. Based on the time-based activities costing methodology pioneered by Robert S. Kaplan and Michael Porter for the field of health care, DMC has adapted and developed for the field of education a simplified method to calculate the correct and true costs of interventions.8

This approach requires that the district create a process map that tracks the process for a student to achieve a certain educational outcome (Exhibit 6). Schools could monitor the process needed to help students reach mastery in algebra or to achieve a certain reading level, for instance.

With the process mapped, the district must then calculate the cost associated with each step of this process. The first step is to calculate the fully loaded, direct cost of intervention, which typically comprises the cost of the teachers providing the instruction. Once direct costs are calculated, indirect costs also need to be added; since these indirect costs can account for as much as or more than 30% of total costs, they should not be ignored. Indirect costs include central office expenses such as curriculum fees, superintendent office expenses, transportation expenditures, utilities, and professional development costs, including common planning time or administrative trainings. Indirect costs also include salaries for principals, assistant principals, and other non-instructional personnel budgeted at the school level. All of these costs must be captured in order to ensure that an accurate financial picture emerges (Exhibit 7).



EXHIBIT 7: COMPLETE COST ANALYSIS

The Next Step

DMC has been working to refine the AVA approach. In conjunction with a few of our member districts, we are identifying, testing, and applying preliminary lists of segmentation categories in actual settings. DMC has also developed worksheets for A-ROI and detailed cost accounting.

Given the size and complexity of school districts, it may be easiest to begin by applying the AVA approach to new or recent initiatives that are being rolled out in a district. Setting up the segmentation, performance measure metrics, and cost accounting upfront is far simpler than attempting to cull this data after the fact.

DMC has shared these concepts at recent meetings with DMC members, and we look forward to sharing more broadly our frameworks and toolkits for this new approach as we refine it further.

Conclusion

Despite decades of effort and investment to improve the performance of public K-12 education, the United States has been unable to show significant, steady progress, as shown by its NAEP scores and PISA results, despite spending more than the average OECD nation. In addition, Americans' satisfaction with the U.S. public education system has been on the decline for the past ten years.

With the population of high-needs students on the rise and with mounting fiscal pressures ahead, it will be critical to focus resources on those practices that provide the most gain for students. An AVA approach that incorporates (1) a detailed segmentation of student need with (2) standardand duration-specific outcome measurements, as well as (3) a thorough cost-accounting system will provide the information necessary to understand the effectiveness of an initiative, and to weigh its cost-effectiveness vis-à-vis other alternatives.

Only by conducting this type of analysis can the efficacy of various interventions be accurately understood and interventions be appropriately deployed for the students who are most likely to benefit. This type of analysis also enables the comparison of interventions on the basis of cost-effectiveness so that the most benefit can be gained with the limited resources available. The AVA approach offers a clear means for the U.S. public education sector as a whole to improve performance in a systemic, scalable, and sustained way.

NOTES

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