The “Failure” of New Technologies to Transform Traditional Teaching in the Past Century

Understanding “failure” in education is unlike the multi-billion industry of “failure analysis” when engineering and psychology experts figure out why bridges collapse, airplanes crash, and nuclear plants melt down. In those cases failure is clear cut: cars topple off bridges; people die in crashes, reactors emit radioactivity into the air harming both workers and nearby residents. The product has failed and the consequences in lives, money, and public confidence are evident. Analyzing and then determining why the bridge, airplane and nuclear plant failed is essential.

In these clear-cut instances of “failure,” state and federal agencies launch investigations to figure out what caused the accident. Was it mistakes made by pilots, metal fatigue in the aircraft, design flaws in the bridges, or combinations of these and many other factors? In short, “failure analysis” invokes the protocols of scientific inquiry to find exact causes of the accident to prevent future disasters.¹

When it comes to school reform, however, determining whether the new policies are “failures” and why they happened is much more ambiguous. In the case of education there is no clear product being sold to the public which can be assessed for whether it “worked.” Surely there are innovations designed to improve schooling that require resources and organizational infrastructure to implement the reform. But no scientific protocols exist to pursue “failures.” No official agencies investigate when a serious, well-funded school reform is de-funded and disappears after three years. Hence, “failure” of school reform is an inexact concept that needs specific questions to unlock the puzzle of reforms that seemingly “succeed” or “fail.” And that is what I propose to do in this chapter.

Take, for example, the “Gary Plan” of school organization.
In 1906 in a town built by U.S. Steel on the shores of Lake Michigan, a new superintendent introduced an educational innovation that hundreds of school districts adopted in the next decade. Visitors traveled thousands of miles to meet Superintendent William Wirt, sit in classrooms of cheerfully decorated schools, and marvel at how children of immigrants learned during the day while their non-English speaking parents attended classes at night. Even though U.S. Steel owned the property and employees largely ran the town, the educational experiment converged with company interests in providing what observers called a productive education for both white-collar and blue-collar employees.

Progressives of the day, imbued with the revolutionary ideas of John Dewey and Frederick Taylor’s scientific management, wrote articles and books praising the combination of work and play, of school and community, of efficiency and civic-mindedness that put the name of Gary, Indiana on the early twentieth century map of school reform.  

The Platoon School (or Gary Plan) had been introduced in a remodeled elementary school holding children from kindergarten through the twelfth grade. Administrators divided the student body into two groups or “platoons.” One platoon would be in the classrooms or auditorium while the other would be in the basement where there were woodworking, printing, and other shops; upstairs in music, art, and play rooms; or outside on the playground. During the day, each platoon would change places, giving each child academic, practical, recreational, and aesthetic experiences while using the entire facility. Most urban elementary school children in 1906 stayed the entire 6-8 hour school day in a self-contained classroom with one teacher; but Gary pupils worked with many teachers during an eight-hour day, even receiving released time for religious instruction. Here was progressivism contained within an innovative school shaping how teachers teach and what students learned.
Moreover, because Superintendent William Wirt believed in tying the city of Gary to its schools, adults (many of whom were recent immigrants working in the steel mills) would attend evening classes to learn English, hear lectures, and use various shops to learn industrial skills. Such a work-study-play-community school arrangement—a revolutionary shift in school organization and curriculum—made it possible to have many more students attend school since the schedule permitted all available space to be used by students during the day and adults at night. The Gary innovation married the efficiency and pedagogical wings of Progressive education; it spread swiftly across the nation. Educational pundits of the day applauded its success.

Yet when the reform-minded Mayor of New York, John Mitchel, brought the Gary Plan to New York City before World War I—William Wirt was hired as a consultant—immigrant-led protests and student riots led to the quick demise of the reform within three years.

Nationally, by 1918, two educational experts completed a study of the Gary schools. It praised some aspects of the platoon plan but raised serious questions about the quality of academic work and weak student performance on achievement tests. Soon after, with the toppling of the innovation in New York City, national interest in the Gary Plan ebbed considerably. By the mid-1930s, the innovation had receded from the national scene yet continued in scattered districts across America. In Gary, it lasted in some form or another into the 1940s.

Today Platoon Schools are largely forgotten. Yet the progressive ideas of using buildings fully, offering a diversified curriculum combining academic subjects, practical tasks, and play in which students move to various parts of the school building, and having the school as an
educational, social, and recreational center for adults have become mainstream features of contemporary elementary schooling. The Platoon School is in the DNA of the modern school. Was the Platoon School a “success,” then, because it became popular in the media and spread swiftly to hundreds of school districts? Or was it a “success” because it changed how teachers taught daily? Or was it a “success” because it lasted for over four decades in Gary and through many adaptations evolved into the current elementary school?

Or was the reform a “failure?” After all, the Gary Plan soared in popularity, matured, and then vanished from the national scene. Few present-day school reformers would recognize the name or remember the program. The Gary story suggests the puzzling ambiguity of, if not confusion in, evaluating the “success” and “failure” of school reforms.

Or consider the “Open Space” schools of the 1960s and 1970s. Instead of self-contained, four-walled classrooms of about 900 square feet holding one teacher and 25 students that opened up into long hallways, school boards hired architects to design schools without walls with large open spaces—sometimes called pods—where teams of teachers would teach multi-age children, collaborate with one another nearby and come up with innovative lessons that would engage students and sustain academic achievement.

The newly designed physical structure would alter traditional age-graded schools in organizing students (e.g., multi-age groups rather than separating children and youth by age) how teachers worked together (e.g., team teaching rather than teachers assigned to separate classrooms) and how they taught the required curriculum by tailoring instruction and learning to the differences among students in abilities and their needs (e.g., whole group, small groups, individual work, and crossing subject boundaries with thematic units rather than the familiar whole group instruction of lectures, guided discussion, textbooks, homework, and tests). Student-
centered teaching, not the familiar teacher-centered lesson—would become the norm, open space reformers assumed.*

Open space architecture and enthusiasm for innovative grouping of children, teaching, and learning customized to individual students spread rapidly across the U.S. In the Washington, D.C. area, for example,

The District of Columbia schools spent $163 million in the 1970s to build 17 open space schools. In the same decade, Arlington County (VA) spent $25 million to convert 13 traditional schools into open space facilities. Montgomery County (MD) spent $32 million to build 21 open space schools and Fairfax County (VA) spent $48 million on 13 buildings that combined both open and closed space.  

Yet within a decade, these open space schools had put up partitions, built walls and went back to self-contained classrooms where again traditional lessons reigned. By the end of the 1980s, open space schools were a prime example of a seemingly “failed” reform.†

---

* Open space schools refers to the interior architecture of the school where large, medium, and small spaces can be used to accommodate large-group, small-group, and independent work by students and teachers. Often confused with open space schools are “open education” and “open classrooms.” Although these pedagogical reforms are linked, they are independent of one another.

Open education surged in popularity in the late-1960s as a British import of progressive way of teaching primary and upper-grade children through small-group and independent work, much student decision-making in choosing the “learning centers” they would move through during the school day in traditional age-graded classrooms. The role of the teacher was closer to a coach and guide rather than engaging in teacher-directed lessons, using textbooks, administering quizzes and exams, and assigning nightly homework. Many advocates of “open education” also promoted open space schools to get rid of the age-graded school thus linking the two reforms. See Larry Cuban, “The Open Classroom,” Education Next 2, no. 4 (Spring 2004): 69-71, accessed May 4, 2017, http://educationnext.org/files/ednext20042_68.pdf.

† I served as superintendent in the Arlington (VA) Public Schools between 1974-1981. I visited schools and classrooms a few days each week and by the end of my first year, I noticed that in at least a half-dozen open space elementary schools built in the late-1960s and early 1970s, partitions made of book cases, newly installed accordion separators, and plastered walls had been erected to re-create separate classrooms for K-6 teachers.
Fast forward to the second decade of the 21st century. Open space architecture in brand new building and refurbished older buildings has reappeared. Fueled by the ubiquity of computer devices and rhetoric about new technologies in practice such as “blended learning” and “personalized instruction” new schools have been erected that have flexible space—common areas for clusters of classrooms, small conference rooms, and space for individual students to read alone, work on laptops and tablets to do exercises. Multiple-sized spaces have returned in many buildings for both students and teachers to use new technologies in daily lessons. These new spaces again promised that teachers would shift from traditional lessons to student-centered ways of teaching that differentiated instruction and involved children and youth in daily activities.  

Does this historical recounting of the once innovative open space architecture in schools in the late-1960s mean that it was a “success” for a brief moment in time—a shooting star—but eventually “failed” because walls and self-contained classrooms returned by the 1980s? Or did teaching staffs tame the open spaces by picking and choosing what aspects of space they wanted to remain open and which they wanted to partition? School staffs, in effect, changed the reform to fit the goals, structures, and culture of the age-graded school. If so, the concept of “failure” fails to capture this common pattern of schools taming reforms to fit the immediate context.  

There are clear questions that need to be asked about the content of specific reforms, who pushes them, the criteria used to determine “failure,” and the time scales policymakers, researchers, and practitioners use to judge whether a reform flies or flops.  

To answer these questions, I will concentrate on those reforms that state and district policymakers, past and present, pressed on local schools to alter how teachers usually teach. For well over a century, political, social, and educational beliefs about which kinds of teaching were
(and are) best have shifted back and forth between those who believed in and practiced teacher-centered instruction and those who just as deeply believed in student-centered forms of instruction.

Trying to alter how teachers teach has recurred often because reformers, like parents, policymakers, administrators, researchers, and non-educators, believed that their version of “good” teaching would lead to student learning. “Better” teaching meant “better” learning. And that has certainly been the case with the contemporary reformers seeing new technologies dramatically shifting daily classroom practices.  

But, it is important to note at the outset, there is a huge difference between policy talk, policy adoption, and policy implementation that many policymakers, researchers, practitioners, and voters fail to take into consideration when test results or graduation rates are published. Judgments of “success” and “failure” often get scrambled precisely because of the time lag between rhetoric, policy decision, and implementation. 

Reforming Teaching Practices (1890s-Present) 

At least, three times in the past century, champions of student-centered instruction have mounted earnest reforms to reduce, even end, the dominant practice of teacher-directed instruction: early decades of the 20th century, the 1960s and 1970s, and in the initial decades of the 21st century.

From the early 19th century, teacher-centered and student-centered traditions characterized classroom instruction. The teacher-centered tradition refers to teachers controlling what is taught, when, and under what conditions.
Were you to sit for a few minutes in such an elementary or secondary classroom you would note that the furniture is usually arranged in rows of desks or chairs facing the front whiteboard, teachers talk far more than students, the entire class is most often taught as one group with occasional small groups and independent work, and students regularly use texts to guide their daily work. Scholars have traced the origins of this pedagogical tradition to the ancient Greeks and religious schools centuries ago and have called it by various names: “subject-centered,” “teaching as transmission,” and “direct instruction.”

The student-centered tradition of instruction refers to classrooms where students exercise a substantial degree of responsibility for what is taught and how it is learned. Teachers see children as more than brains; they bring to school an array of physical, psychological, emotional, and intellectual needs plus experiences that require both nurturing and prodding.

Were you to sit for a while in such a classroom you would see that the furniture is arranged and rearranged frequently to permit students to work independently or together in large and small groups. Student talk is at least equal to, if not greater than, teacher talk. Varied materials (e.g., science and art centers, math manipulatives,) are spread around the room. Guided by teachers, students learn content and skills through different tasks such as going to activity centers in the room, joining a team to produce a project, and working independently. Scholars have tracked this tradition to its historical roots in ancient Greece and labeled it over the centuries as “child-centered,” “progressive,” and “constructivist.”

Champions of each tradition believe that all students, regardless of background, grasp subject matter, acquire skills, cultivate attitudes, and develop behaviors best through its practices. Yet the accumulated evidence of actual classroom practices producing desired student outcomes for each tradition has been both mixed and unconvincing.
Researchers have yet to link ways of teaching to student test performance because so many variables influence achievement such as school organization, teacher expertise and experience, family background, peers, and dozens of other factors including, yes, pedagogy. Lacking substantial evidence to support one form of teaching over another, faith not facts, has driven proponents of each tradition throughout the 20th century.

Fierce rhetorical struggles over which ways of teaching and learning are best for all or some students—often mirroring larger conservative vs. liberal ideological battles over religion in schools, ending poverty, and child-rearing practices—have ebbed and flowed.

As each generation of reformers fought in academia, state legislatures, and school districts to shift classroom practice from teacher- to student-centered, a few victories occurred rocking established practices but insufficient to end the dominance of teacher-centered instruction.

In each wave of reform, however, certain aspects of student-centered instruction became part of teacher repertoires in classroom practice (e.g., small group work, rotation of learning stations, field trips). Over time, hybrids of both traditions slowly spread across the nation’s classrooms.

Then beginning in the mid-1980s and gathering momentum in succeeding decades was another generation of reformers eager to alter dominant classroom practice seeing the promise of

new technologies such as computers being the catalyst to finally convert teacher-centered classrooms (including many hybrids) into student-centered ones.¹


In assessing the presence of digital devices (e.g., desktop computers, laptops, tablets, etc.) in classrooms over nearly four decades in public schools, it is crucial to separate teacher and student access to devices from their use in daily lessons.

Access

Previous electronic devices like film projectors, radios, and televisions were expensive and allotted in small numbers to each school. Teachers, for example, had to find the films, schedule the projector for their lessons, and locate a copy of the film they wanted to show even before the lesson unfolded. Initially in the 1980s, few desktop computers were available to teachers and students. In these years, there were about 125 students per computer nationally. By the first decade of the 21st century, the ratio of devices to students had dropped to three students

per computer with many districts across the nation distributing tablets and laptops to each and every student.  

That it has taken nearly 40 years to have these devices widely accessible to teachers and students is common across other institutions. 

Historians of technology, for example, point out that it took a half-century after the introduction of turbine-generated electric power in the U.S to eventually light streets, power trolleys, build industrial assembly lines, and upgrade homes with incandescent lights, refrigerators, telephones, and automatic washers. 

As in electrifying industry and home, the trend of greater access to devices and software and greater use in school is clear, at least from teacher self-reports and school surveys. Most teachers, in varying degrees, have integrated new technologies into varying degrees into their daily lessons. 

Use 

Teacher self-reports, school surveys, and classroom observation document increased teacher use of devices since the 1990s. Researchers have repeatedly detailed the spread of teachers using computers in labs and classrooms. 

Direct observation of classrooms has also confirmed that more and more teachers have been using new devices and software in lessons. For example, I studied teacher use of computers in Silicon Valley since the mid-1980s. That pattern of spreading student use of computers for daily lesson was in place by the late-1990s when I returned in 2010 to a high school I had studied in 1998.
Las Montanas (a pseudonym for a Northern California high school) had moved from reliance upon computer labs and a media center in 1998-1999 to classroom laptops available to each student and classrooms furnished with interactive whiteboards a decade later. A substantial majority of Las Montanas academic teachers integrated laptops into daily lessons in varying degrees. 18

New Technologies and Better Teaching

Over the past thirty years the introduction of new technologies such as the desktop computer, laptops, and tablets, another generation of school reformers have come of age promising again that deep changes in traditional teaching will occur as these new technologies---both hardware (e.g., bandwidth, wireless, and devices) and software (e.g., math programs, personalized learning plans, individual playlists)---customize teaching and learning as never before.

Consider typical claims reformers make: “Computers, the Internet, online courses, smartphones, cameras, interactive whiteboards, and other digital tools play an important role in improving and, yes, transforming schools. The role of technology in schools will increase, and as we use these new tools wisely, they help make schools more effective and engaging (2012).”19

Online learning, reformers claim, will “disrupt” schooling as it is traditionally organized and operated:

What does stand to happen in K-12 education is a transformation, where the schools of tomorrow look radically different from schools of today as a result of disruptive changes in subsystems beneath them, i.e. classes, after-school services, etc. Schools may become community hubs where students come to collaborate, work online, get mentoring,
tutoring, and individualized help – a stark contrast from the whole group instructional model of today where whiteboards and desks reign supreme. (2016).

The language of school reform, especially when it comes to new technologies, then, is often unalloyed hype---“software will disrupt schooling”-- that has to be sorted out from actual policy language that state and local school boards use in deciding which software and hardware to buy and why. Rhetoric to advance a policy position is one thing, a school board adopting a policy is another. When a school board says it will provide every kindergartner with iPads or a superintendent recommends that all high school students take at least two online courses to meet

** Like past electronic technologies, vendors and enthusiasts have hyped them to solve problems from low academic performance to alienation among students to traditional teaching practices. Hype is over-promising; over-promising inexorably leads to disappointment; disappointment builds cynicism. I am allergic to hype.

New technologies, for example, are experiments–alpha and beta versions–used to find out whether they are workable and even useful on students who are compelled to be in school and know little about consequences. Combine hype and experimentation and that is a potentially toxic combination. Thus, hard questions must be asked of those policymakers who buy and deploy electronic devices for classroom instruction.

The most important of these questions is about the evidence supporting substantial investment in new technologies. A 2005 summary in a handbook of teaching found little support for widespread policy beliefs in the learning that occurs in using multimedia.

This chapter describes five commonly held principles about multimedia learning that are not supported by research and suggests alternative generalizations that are more firmly based on existing studies. The questionable beliefs include the expectations that multimedia instruction: (1) yields more learning than live instruction or older media; (2) is more motivating than other instructional delivery options; (3) provides animated pedagogical agents that aid learning; (4) accommodates different learning styles and so maximizes learning for more students; and (5) facilitates (student-managed constructivist and discovery approaches that are beneficial to learning. Richard Mayer, ed, The Cambridge Handbook of Multimedia Learning (Cambridge, UK: Cambridge University Press, 2005), accessed May 4, 2017, http://bilder.buecher.de/zusatz/21/21590/21590924_vorw_1.pdf, pp. 97-116

Surely it is possible that subsequent research has found support for these policy beliefs. In the years since 2005, I have yet to find sufficient research that would support these beliefs.

The enormous amount of money spent on new technologies without much evidence of their efficacy on teaching and learning means that other options such as investing in more teachers and their professional development are lost. That is inefficient and ineffective policymaking.

Given these reasons, I remain skeptical of new technologies applied to classrooms and schools on the basis of effectiveness.
graduation requirements, those are policies that are grounded with resources and requirements—not merely inflated claims or magical promises. Adopted policies differ drastically from the rhetoric, rich in the vocabulary of “revolutionary” and “transformative” language accompanying efforts to introduce new technologies into schooling. 21

And policy adoption differs from actions taken to put new technologies into classroom lessons. Teachers are gatekeepers to local, state, and federal policy directives. When they close their classroom doors, they decide what the objectives, activities, and assessments will be in the lesson they teach to five year-olds and Advanced Placement Physics students. Putting an adopted policy—a new reading or math program--into practice, then, requires teacher knowledge and skills to be in place and teachers’ cooperation before it can be conveyed to students in ways consistent with the policy. Classroom implementation is not an after-thought encased in professional development workshops. Full and faithful implementation is the difference between a horse and horseradish.

Has Nearly Universal Student Access and Widespread Teacher Use of Computer Devices Changed Daily Classroom Practices Since the 1980s?

The short answer is yes. Slowly and steadily, teaching practices, including organizing and executing classroom tasks, have shifted over nearly four decades to become a blend of old and new behaviors, hybrids of teacher- and student-centered practice.

Most teachers now, using laptops and tablets, take attendance, record assignments, check homework, assess students, and email parents. Teachers organize lessons to include whole-group, small group instruction, and independent student work. Many teachers create individual playlists of math, science, and social studies sources for students to engage in research projects. There are
entire schools now that use “personalized learning plans” that individualize lessons and student self-assessment. These are, indeed, additions to the familiar pedagogical tool-kit teachers have used for nearly two centuries.

Listing new and altered practices associated with the spread of electronic devices may make it seem like classroom practices have meaningfully changed, but the situation is significantly more complicated than that. If defining “failure” is tricky, defining the concept of “change” in practice is doubly so. Is using an interactive white board instead of an overhead projector and chalkboard a substantial “change” or simply a tiny modification of a habitual practice. Or is it a “change” in classroom practice when a teacher takes attendance on her tablet instead of checking off names on a sheet of paper? Is it a “change” when students submit electronically their notes and assignments to Dropbox instead of turning in paper homework? 22

Surely, these instances are “changes,” albeit incremental ones in familiar practices. Teachers would readily acknowledge that such alterations in routines save time and energy. Technologically-driven reformers, however, might begrudgingly admit that these examples are “changes” but not ones that they envisioned. They would be disappointed. They want deeper and broader shifts in practice that moved the center of gravity from brick-and-mortar schools to online lessons at home, to entrepreneurs creating virtual schools, and teachers wholly using project-based learning and individual lessons tailored to different students. Such desired “changes” can be labeled fundamental. 23

So answering the question of whether widespread student access and teacher use has “changed daily classroom practices” depends upon who is the asker, who is the doer, and what actually occurs in the classroom.
To determine what has changed in classroom practice, the extent of the change, and whether it is incremental or fundamental (or a mix of the two) requires a combination of sources such as direct observations of lessons, teacher and student self-reports, teacher diaries, and similar evidence.††

Most important, in analyzing these facets of classroom practice, attention has to be paid to the tacit biases that inhabit those who observe, describe, and analyze how lessons unfold. A teacher, principal, parent, researcher, and policymaker, for example, have different organizational roles and experiences. They approach data from varied perspectives. Those differences have to be made explicit in making sense of these primary sources.

†† I distinguish between two kinds of planned changes, fundamental and incremental, that have occurred in U.S. schools over the past two centuries. By “fundamental change” I mean altering the basic building blocks of U.S. schooling such as requiring taxpayers to fund public schools and give access to all students, establishing goals for schooling (e.g., all students will be literate, discharge their civic duties, and be vocationally prepared for the labor market), and organizing curricula and instructional practices in age-graded elementary and secondary schools. These “building blocks” are structures that have defined public schools for the past two centuries.

Changing them fundamentally means altering funding (e.g., vouchers, charter schools), governance (e.g., site-based management, mayoral control), organization (e.g., moving from an age-graded school to non-graded teams and entire schools, curriculum (e.g., “new” math, “hands-on” science), and instruction (e.g. moving from teacher-centered to student-centered pedagogy). When I initially wrote about planned school change, I called these fundamental shifts in structure, “second-order changes.”

Often those who champion second-order changes in public schools talk about “real reform” or “transformation of schooling.” What they refer to are fundamental changes in one or more structures of schooling, not “first order” or incremental changes.

Incremental changes refer to amendments in current structures, not deep changes to or removal of these core components of schooling. In my earlier writings on school change, I had called these “first-order” changes.

Such changes as creating new academic courses, extending the school day or year, reducing class size, raising teacher salaries, introducing new reading or math programs, etc. do not alter the basic structures of public schools. They correct deficiencies and improve existing structures. They do not replace the goals, funding, organization, and governance of schools. They are add-ons. Many promoters of change in schools call such changes “tinkering,” usually in a dismissive way, because they want “real reform” or fundamental re-ordering of existing structures.
Consider one instance when I observed and interviewed 41 Northern California teachers in 2016 identified by policymakers and principals as exemplary in integrating technologies into their daily lessons. Over 90 percent said that their teaching had changed in how they managed and taught lessons. The examples they gave focused on access to many sources, students doing independent work, managing more efficiently daily administrative tasks that schools have teachers do, and communicating with parents and their students. For those who had access to software that permitted students to submit their work online and programs that allowed real-time responses to students during a lesson said that these changes helped reduce the inherent complexity of teaching of 25-35 students.‡‡

An entrepreneurial high-tech reformer might categorize these “changes” as slight or, perhaps, trivial compared to teachers creating individual playlists for students, teaching during the year through project-based units, students connected to online lessons, and similar “transformative” changes. Or a researcher who observing lessons in these teachers’ classrooms would see the changes as incremental to the dominant pattern of a teacher-directed lesson. Where one sits does shape one’s perspective.

Finally, the criteria used to judge whether the “changes” improved or hindered student learning (or some mix of the two) has to be considered as well as who does the judging of progress or regress.

‡‡ During 2016, I visited classrooms in at least 10 schools in Silicon Valley. I interviewed nearly all of the teachers and they answered in writing the prompt I gave them: “Has your use of computers changed how you teach? If yes, in what ways. If no, why not.” Publication of articles and a book on this research will occur in 2018.
What Criteria Are Commonly Used to Judge “Success” and “Failure” of Changes in Classroom Practice?

The dominant standard used by most policymakers, media editors, administrators, and the general public to judge success is effectiveness: What is the evidence that the policy has produced the desired outcomes? Have you done what you said you were going to do and can you prove it? In a society where “bottom lines,” Dow Jones averages, sports’ wins and losses, and vote-counts matter, quantifiable results determine effectiveness.

Since the Elementary and Secondary Education Act (1965), federal and state policymakers have relied on the effectiveness standard to examine what students have learned by using proxy measures such as test scores, high school graduation rates, college attendance, and other indicators. For example, in the late-1970s policymakers concluded that public schools had declined because scholastic aptitudes test (SAT) scores had plunged downward. Even though test-makers and researchers repeatedly stated that such claims were false—falling SAT scores fueled public support for states raising academic requirements in the 1980s and adding standardized tests to determine success. With the No Child Left Behind Act (2001-2016) test scores brought increased threats of rewards and penalties. 24

Yet test results in some instances proved unhelpful in measuring a reform’s success. Consider the mid-1960s’ evaluations of Title I of the Elementary and Secondary Education Act (ESEA). They revealed little improvement in low-income children’s academic performance thereby jeopardizing Congressional renewal of the program. Such evidence gave critics hostile to federal initiatives reasons to brand President Lyndon Johnson’s War on Poverty programs as failures. 25
Nonetheless, ESEA’s political attractiveness to constituents and legislators overcame weak test scores. Each successive U.S. president and Congress, Republican or Democrat, have used that popularity as a basis for allocating funds to needy students in schools across the nation including No Child Left Behind (2001) and its successor, Every Student Succeeds Act (2016). Thus, a reform’s political popularity often leads to its longevity (e.g., kindergarten, comprehensive high school, Platoon School).

_Popularity_, then, is a second standard that public officials use in evaluating success. The spread of an innovation and its hold on voters’ imagination and wallets has meant that attractiveness to parents, communities, and legislators easily translates into long-term political support for reform. Without the political support of parents and teachers, most innovations and reforms would sputter, limp along, and disappear.

The rapid diffusion of kindergarten and preschool, special education, bilingual education, testing for accountability, charter schools, and electronic technologies in schools are instances of innovations that captured the attention of policymakers, researchers, practitioners, parents, and taxpayers. Few educators or public officials questioned large and sustained outlays of public funds for these popular reforms because they were perceived as resounding successes. And they have lasted for decades. Popularity-induced longevity becomes a proxy for effectiveness.  

A third standard used to judge success is assessing how well innovations mirrored what designers of reforms intended. This _fidelity_ standard assesses the fit between the initial design, the formal policy, the subsequent program, and its implementation in classrooms.

Champions of the _fidelity_ standard ask: How can anyone determine effectiveness if the reform departs from the design? If federal, state, or district policymakers, for example, adopt and fund a new reading program because it has proved to be effective elsewhere, teachers and
principals are expected to follow the blueprint as they put it into practice or else desired outcomes will go unfulfilled (e.g., Success for All). When practitioners add, amend, and drop features of the original design, then those in favor of fidelity as a criterion say that the policy and program cannot be determined effective because of these changes. Policy adaptability is the enemy of fidelity. 27

But where do these beliefs embedded in these criteria come from? The growth of professional expertise in the private and public sectors, or what Donald Schön calls “technical rationality,” is grounded in the natural, physical, and social sciences and located in, among varied venues as corporate training, medical practice, and professional education programs at universities. Rather than favoring practitioner expertise derived from schools and classrooms, public officials and researchers use this scientifically grounded knowledge to evaluate the degree to which reforms are effective. 28

Contrary to the effectiveness and fidelity standards, popularity derives from the political nature of public institutions and policymakers’ astute use of symbols (e.g., tests, pay-for-performance, computers) to convey values. Schools, for example, are totally dependent on the financial and political support of local communities and the state. Taxpayer support for, or opposition to, bond referenda or school board initiatives is often converted into political capital at election time. Whether an innovation spreads (e.g., charters, student access to computers) and captures public and practitioner attention becomes a strong basis for evaluating its success. 29

Seldom are these criteria debated publicly, much less questioned. Unexamined acceptance of effectiveness, fidelity, and popularity avoids asking the questions of whose standards will be used, how they are applied and alternative standards that can be used to judge reform success and failure.
Although policymakers, researchers, and practitioners have vied for attention in judging the success of school reforms, policy elites, including civic and business leaders and their accompanying foundation- and corporate-supported donors have dominated the game of judging reform success.

Sometimes called a “growth coalition” these civic, business, and philanthropic leaders see districts and schools as goal-driven organizations with top officials exerting top-down authority through structures. They juggle highly prized values of equity, efficiency, excellence, and getting reelected or appointed. They are also especially sensitive to public expectations for high academic standards, school accountability, and test scores. Hence, these policymaking elites favor standards of effectiveness, fidelity, and popularity—even when they conflict with one another. Because the world they inhabit is one of running organizations, their authority and access to the media give them leverage to spread their views about what constitutes “success.”  

So it is no surprise that these criteria become harnessed to how they are connected within K-12 organizations. For the most part, decisions flow downward. Elected leaders in coalition with top civic figures often take innovations directed at school improvement, package and deliver the reform (e.g., curriculum, instruction, school re-organization) to classrooms through state and local policies. While there are other ways for reforms to enter schools such as from the local school community and practitioners—from the bottom up—the top-down political decision to impose a reform on the organization from federal, state, and district leaders has been the dominant pattern in the history of school reform.  

The world that policy elites inhabit, however, is one driven by values and incentives that differ from the worlds that researchers and practitioners inhabit. Policymakers respond to signals
and events that anticipate reelection and media coverage. They consider the standards of effectiveness, fidelity, and popularity rock-hard fixtures of their policy world.  

Most practitioners, however, look to different standards. Although many teachers and principals have expressed initial support for high-performing public schools serving the poor and children of color, most practitioners have expressed strong skepticism about test scores as an accurate measure of either their effects on children or the importance of their work.

Such practitioners are just as interested in student outcomes as are policymakers, but the outcomes differ. They ask: What skills, content, and attitudes have students learned beyond what is tested? To what extent is the life lived in our classrooms and schools healthy, democratic, and caring? Can reform-driven programs, curricula, technologies be bent to our purposes? Such questions, however, are seldom heard. Broader student outcomes and being able to adapt policies to fit the geography of their classroom matter to practitioners.

Another set of standards comes from policy and practice-oriented researchers. Such researchers judge success by the quality of the theory, research design, methodologies, and linkages to policy and student outcomes. These researcher standards are selectively used by both policy elites and practitioners in making judgments about high- and low-performing schools.  

So multiple standards for judging school “success” are available. Practitioner- and researcher- derived standards have occasionally surfaced and received erratic attention from policy elites. But it is this strong alliance of policymakers, civic and business elites, and friends in foundations, and media worlds that relies on standards of effectiveness, fidelity, and popularity. This coalition and their standards continue to dominate public debate, school reform agendas, and determinations of “success” and “failure.”
Now, here is the spot where I should say which of these three sets of standards for judging success of reforms is best and should be used. I won’t do that. Why?

While I prefer a mix of standards driven by practitioner values and the effectiveness criterion, my preference is marginal to the current dominance of policymakers’ test-driven criteria in judging reform reflects the abiding fact that public schools have been shaped by political decisions since their founding nearly two centuries ago. In a market-driven democracy, whose standards dominate decisions on reform success are politically determined. Without a collective political effort to change policy elites’ standards of effectiveness, fidelity, and popularity, they will remain and alternatives to those standards—adaptability and research pristineness -- will remain marginal. So what I prefer, while informed by the history of school reform, is, at best, marginal to the current political thinking about which criteria are primary. §§

Summary and Conclusions

Professional judgments about failure are straightforward when airplanes crash and people die; cars topple off bridges; radioactivity is released from the reactor harming both workers and nearby residents. In these incidents, the stated goal of safe travel by aircraft, cars crossing

§§ Before the Coleman Report (1966), judging school quality depended upon the inputs that districts spent on schools (e.g., per-pupil expenditures, facilities, equipment, books, etc.). Schools that measured high on those indicators were called “good” schools. The Coleman Report used students’ standardized achievement test scores to measure improved academic performance. Within a decade, the Effective Schools movement that identified high-performing schools with mostly poor children of color had spread sufficiently that the standard of school quality—high inputs—shifted to high outputs (e.g., test scores, graduation rates, percentages of graduates going to college). That shift in standard of quality spread in the 1980s and was incarnated in the No Child Left Behind Act (2001). See Lawrence Lezotte, “School Improvement Based on Effective Schools Research,” International Journal of Education Research 13, no. 7 (1989): 815-25, accessed May 4, 2017, doi:10.1016/0883-0355(89)90031-1; Eric Hanushek, Making Schools Work: Improving Performance and Controlling Costs (Washington, D.C.: The Brookings Institution, 1994).
bridges, and safe energy production is unmet. The outcomes of these failures is immediately evident and consequential.

Investigators arrive and determine causes of failure ranging from human error, metal fatigue, design flaws, or combinations of these and other factors. What is learned from the failure can reduce chances of a similar accident occurring again.  

“Failure” of school reform, however, is neither a settled nor precise concept. Schools have multiple goals (e.g., literacy, workplace preparation, engaged citizens, creating independent thinkers, strengthening moral character, etc.) and perform different functions (e.g., custodial, socialization). Seldom do reforms aimed at improving school governance, organization, curriculum, and instruction such as Common Core standards, personalized learning through technology, and eliminating tracks in secondary schools have a sole aim. Again and again, these reforms seek multiple outcomes, many of which cannot be specified in advance.

When a highly regarded reform flops (e.g., teachers using behavioral objectives in their lessons in the 1960s; school site management councils in the 1970s; district and state competency tests in the 1980s) the causes are unclear because these adopted reforms not only accompanied other initiatives but also sought to achieve multiple goals and functions. Moreover, who was harmed by the reform “failure” is ambiguous. Teachers? Students? Public confidence in schools?

Figuring out what caused a reform to “fail,” then, is murky. What were the multiple aims for the initiative? Was it part of a package of reforms to be implemented simultaneously? Was the design flawed? Were there insufficient resources committed to the reform? Did teachers understand the reform and had they been prepared to put it into practice? Were parents and
community members fully apprised of the innovation? Did they support it? Was implementation of the reform incomplete? Or perhaps there was a combination of these and other factors.

Consider also that the time frame used to determine “failure” varies considerably (e.g., math and science curriculum reforms that occurred in the 1960s lasted a decade, those in the 1980s less than a decade because each had its particular political and organizational context). Or consider the ongoing controversy over Common Core curriculum standards in math and language arts adopted in 2010 and are now pronounced “successful” in some districts and “failures” in others.  

Then look to the varied criteria (e.g., effectiveness, political popularity, longevity, adaptiveness) historically used to judge “failure” or “success.” And who not only decides which criteria to use (e.g., business and civic elites, media leaders) but also how they are applied organizationally (e.g., top-down, bottom-up). All of these combine to cloud the concept.

Finally, heightening further the ambiguity of reform “failure” occurs when initially popular reforms (e.g., Platoon School, open space architecture new math and science standards) slowly evaporate only to re-appear at later times in different incarnations.

Although it may be a rhetorical and political asset to use the word “failure,” these many distinctions suggest strongly that the concept of “failure” is unsuitable for serious policymakers to apply to most school reforms. It is unfit, especially so, when it comes to using technology to shift classroom practice from teacher- to student-centered.
As a result of ubiquitous access to computer device over the past 30 years, have teaching practices changed?

ANSWER: Yes. There have been clear-cut, observable changes in how most teachers use devices in lessons. More teachers include hardware and software applications in their lessons than thirty years ago. If the time frame extends back to a century ago when film and radio entered classrooms, changes in teacher use of electronic devices are noticeable. The evidence comes from national studies of teaching practices (mostly self-reports), case studies including my own research, and indirect evidence drawn from student reports.

Have those changes substantially shifted teaching practices from teacher- to student-centered?

ANSWER: No. Instead, a slow accumulation of incremental changes engineered by teachers has yielded a hybridization of classroom practices. Features of student-centeredness (e.g., small groups and independent student work, project-based teaching) have entered the repertoires of many teachers. Yet those teachers continue to teach lessons that follow the century-old patterns of teacher-centered instruction. Lessons have a beginning, middle, and end. Lectures, homework, tests, and teacher-guided whole-group discussions, and small-group work—activities familiar to teachers in the 1950s—flow through a lesson, albeit in different allocations of time. In the confines of the age-graded school organization, teachers have created hybrids of

---

*** In a number of studies I have conducted about technologies used in classrooms since the mid-1980s, I have seen teacher and student access and classroom use of new technologies from desktop computers to tablets expand slowly but surely. See Larry Cuban, *Teachers and Machines: The Use of Technology since 1920* (New York: Teachers College Press 1986), *Oversold and Underused: Computers in the Classroom* (Cambridge, MA: Harvard University Press, 2001), and *Inside the Black Box of Classroom Practice: Change without Reform in American Education* (Cambridge, MA: Harvard Education Press, 2013). I spent 2016 looking at exemplary instances of teachers, schools, and districts integrating the use of technology regularly. See posts on these classroom and school visits at Larry Cuban on School Reform and Classroom Practice at https://larrycuban.wordpress.com/.
practice that mix the old and the new, including technologies. In a spectrum where student-centered is at one end and teacher-centered is at the other end, today’s teachers hug the middle.  

Has student access and teacher use of new technologies in the past 30 years improved teaching and learning?

ANSWER: Depends upon not only who responds to the question but also the complexity of determining exactly what improves teaching and learning. No easy task in either case. Technology-driven reformers and policymakers seeking to transform—“disrupt”—the current practice of schooling and teaching would say, no. Typically, such reformers see U.S. schooling as stuck in a “factory” model that has to be abandoned since improved teaching and learning cannot occur in such schools.†††

Most practitioners who use the technologies regularly in their lessons, however, would say, yes. Their lessons contain more and richer activities, opportunities to individualize instruction are far more available, and students are more motivated and engaged, they would say.‡‡‡

††† A typical sample of the get-rid-of-factory-model can be seen in the following statement by Secretary of Education, Arne Duncan: “What do I mean when I talk about transformational productivity reforms that can also boost student outcomes? Our K–12 system largely still adheres to the century-old, industrial-age factory model of education. A century ago, maybe it made sense to adopt seat-time requirements for graduation and pay teachers based on their educational credentials and seniority. Educators were right to fear the large class sizes that prevailed in many schools. But the factory model of education is the wrong model for the 21st century.” Arne Duncan, “The New Normal: Doing More with Less,” (speech, American Enterprise Institute, November 17, 2010), accessed May 4, 2017, https://www.ed.gov/news/speeches/new-normal-doing-more-less-secretary-arne-duncans-remarks-american-enterprise-institute.

‡‡‡ Of 41 teachers I observed during 2016, 37 told me that their teaching had changed as a result of using devices regularly in their lessons.
But change in teaching practice is not necessarily improvement in either teaching or learning. Parents splitting up is surely a change in family life but hardly an improvement for the children.

Improvement is in the eye of the beholder and convincing evidence that uses of technology in lessons accounted for the improvement in teaching and learning is nearly impossible to show. Consider that the imprecision of determining in what ways and how teaching and learning improve over time has become a cottage industry for researchers. Each concept is complex influenced by multiple variables inside (e.g., teacher, organization, classroom and school culture) and outside the classroom (e.g., community, peers, home).  

Historically, then, looking at past efforts to reform schooling and teaching (e.g. Platoon School, open space schools) and recent efforts to transform teaching through wider and deeper use of new technologies in classroom lessons, the concept of “failure” remains imprecise and in many instances, inapt.

The evidence, however, is strong of many innovations entering schools including new technologies, losing their names yet sticking around by practitioners adapting the reforms to the contours of schooling goals, structures, cultures, and resources. Top-down reforms setting out to alter governance, organization, curriculum, and instruction, more often than not, end up getting customized by schools. That is what has occurred with new technologies seeking to “transform” teaching and learning. Schools change reforms. The label “failure” misses this common pattern by a mile.  

---


17 Cuban, *Teachers and Machines*; Cuban, *Inside the Black Box of Classroom Practice,* chapter 1.


36 Cuban, *Hugging the Middle*.

