Creating Responsive Supply in Public Education

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The first step toward improving public education is to strengthen and deepen our understanding of the diverse needs and preferences of its most important stakeholders: the parents and students it is intended to serve, as well as the educators at the heart of the institution. Despite the very real differences between individuals in these groups, public education institutions have too often aimed straight down the middle, developing monolithic approaches that push aside these differences in the name of equity and fairness. But setting out to treat everyone the same has not led to equitable outcomes for students, nor to fair treatment of educators. We believe that a more attentive understanding of these characteristics, beliefs and behaviors would lead to a supply of schools, tools and services that is more tightly linked with student success. In this paper, we will call for a new mindset that we call *responsive supply*. This mindset not only acknowledges the diversity of needs and preferences among education's central stakeholders, it also seeks to better understand it and harness that knowledge to develop a variety of educational options anchored in these differences. This approach has the potential to dramatically improve public education by enhancing satisfaction, increasing student achievement levels, and improving the productivity of educators, programs, schools and school systems. Existing providers of education could use this kind of approach to adjust the way they do their work, but this information would also encourage a new crop of education entrepreneurs to address more richly defined market niches.

The road toward such responsive supply in public education begins with a serious commitment to placing students, parents and educators at the center of our efforts, and making a significant investment in what the business community calls "market segmentation." This technique consists of education providers – including school systems but also teacher training and certification bodies, large curriculum and assessment publishers, and a range of entrepreneurial organizations – gathering detailed data and information about the characteristics,

needs and preferences of those on the receiving end of schooling. This information is then used to inform decisions about whether to address the resulting groups in a homogenous way, or to differentiate approaches according to the needs of different groups, or even to tailor methods for reaching individuals. Without detailed information, though, we tend to make sweeping assumptions about what people want or need, defer to ideology or intuition, and end up with suppliers who unknowingly waste valuable time, money, and energy – not to mention frustrated consumers who don't get the products, services, or outcomes they're hoping for.

Although such segmentation in public education has been more limited than in other sectors, our recognition of diverse demand – and the resulting differentiation in supply – has increased bit by bit with every passing era. Gone are the days of the one-room schoolhouse, in which children of all ages were educated as one large group; we now have districts divided up into attendance zones that were initially intended to match students with schools based on their neighborhood's needs, and schools that further segment students by grade and increasingly by developmental level. Still, most public education institutions – including the vast majority of districts, nearly all educator preparation programs, and even many entrepreneurial organizations – adhere to a one-size-fits-all mentality, with little responsiveness to the underlying diversity of demand. There has been an increasing amount of what we will call "diverse supply;" this is most familiar at the classroom level with the rise of "differentiated instruction" but can also be seen at the school level in "portfolio districts" that seek to treat different groups of students and families in unique ways by providing them with a variety of school options. There are also experiments underway to take this increasing differentiation to its logical endpoint, by matching diverse individual needs with an equally diverse array of modular products and services that can be combined in exceedingly tailored ways. We will call this approach "specialization," and believe

it holds important potential but also presents some challenges which are of special concern to those seeking to improve outcomes for the students that public education has often failed in low-income communities.

This paper will explain the concept of market segmentation as a foundation for understanding the demand side of education. Then, we will turn toward an exploration of how these principles could advance responsive supply in three areas: in breaking up the current one-size-fits-all mentality that pervades the human capital market, in furthering the diversity of public school options, and in pioneering ways to deconstruct and recombine the various elements of schooling in ways that are tailored to individual students. Ultimately, we hope to make the case for a more open acceptance of the differences among students, parents and educators – and for redesigning our systems to explicitly account for and address those differences.

Market Segmentation 101

In order to lay the groundwork for an understanding of what market segmentation is and how its principles could inform a more responsive approach to supply in public education, it's important to step all the way back to the concept at the heart of it: a market. Simply put, a market is an economic ecosystem in which demand and supply – usually buyers and sellers – meet and exchange something of value. Suppliers provide goods or services that can be acquired, while demand is generally made up of the buyers or recipients of these products or services. The boundaries of markets can be formed in a variety of ways, including by geography (the North American market, the urban market) or by product or industry (the market for coal, the market for cell phones). However, advances in technology are accelerating two divergent trends: markets are becoming simultaneously more global and much more specialized or "niche." The

former trend has been famously explained in books like Thomas Friedman's *The World is Flat*, which pointed out the way technology is leveling the playing field for people in far-flung corners of the globe to transact with one another. At the same time, explains *Wired* magazine editor Chris Anderson in his book *The Long Tail*, our culture and economy are shifting away from a focus on a relatively small number of products that reach a broad market and toward a very large number of small niche players who serve smaller and more precise markets.

Within any market, suppliers and consumers each attempt to maximize their own gain for the lowest cost. There is an implicit assumption that buyers and sellers are able to make choices – suppliers can choose who to focus their supply on, and buyers can choose freely from among a range of suppliers (or choose to exit the market). (We believe such choice is important not only because it introduces accountability among suppliers, but also because it increases the engagement of the stakeholders who make these choices; we will return to this point in the next section.) Together, these dynamics put pressure on suppliers to understand the demand side's needs and preferences so they can compete effectively with other suppliers. Of course, buyers and sellers are human beings, and therefore not always entirely rational, and rarely operate with perfect information. The recent emergence of a field called "behavioral economics" has illuminated the way people bring personal values and emotions to bear on their buying and selling decisions, which complicates these market dynamics – a point we will return to in the next section on education.

When a customer identifies a need, he or she gathers some information and considers the available products and services, often grouping the potential options or vendors in order to make the decision easier. Should I shop at a single-category store like a specialty bakery or are my needs today better met at a superstore like Wal-Mart? Do I need a regular cell phone or a tricked-

out camera-and-Internet-enabled gadget that also makes calls? Often consumers will ask for advice from friends or family with whom they have something in common, and some will even consult with expert sources like Consumer Reports. Suppliers use an even more sophisticated range of information to understand their potential customer base, though. One important part of the analysis they do is called market segmentation, in which the "demand" side is broken down into different distinct parts or "segments." This analysis is used to inform decisions within individual organizations about what kind(s) of supply they will provide; when paired with good information about supply that is made available to the buyer or consumer, such segmentation can help optimize the match between supply and demand in a given market over time.

What this optimization looks like can vary widely. In the business sector, where this approach is most widely and typically used and where money-making is the name of the game, the goal of segmentation is to increase profit by focusing the company's resources on products that are most likely to be purchased by consumers, resulting in maximized revenue for minimized cost. For example, many companies have seized on the "Baby Boomer" demographic segment as an attractive target for everything from health and wellness services to genealogy Web sites that capitalize on the group's concerns as they grow older, and have chosen to plow their resources into products for this market because of its sheer size and perceived spending power. However, maximizing supplier profit isn't the only potential goal: increasingly, public agencies and nonprofit organizations are using this approach to target resources accordingly. For example, the consulting firm Bridgespan Group created a model for the city of San Francisco's "Communities of Opportunity" initiative that categorized families in the city's isolated southeastern neighborhoods into three segments – "families in chronic crisis," "families in a

fragile state," and "families that are self-sufficient" – which allowed the city to target support toward those families in different ways based on their needs.[1]

The nonprofit organization Social Compact has developed a detailed "Neighborhood Market Drill Down" analysis[2] that has been used in places like Washington, D.C. to entice vendors like organic grocery stores to locate in inner-city neighborhoods they might not otherwise consider, by painting a detailed picture of the unmet needs and spending potential of residents. This can surely be a win for the new vendors, but also benefits residents by increasing their satisfaction with the retail options in their neighborhood and potentially their health and well-being by offering healthier food options. As such, segmentation is not just a cold approach to improving a market's efficiency and profits – it's also an empathetic way of figuring out how to improve outcomes for everyone by aligning the needs, preferences and priorities of customers with thoughtful supply that is responsive to their needs.

Market segmentation seeks to group people according to some common characteristic or set of characteristics they share. The most familiar of these dimensions are *geographic* (urban or rural, specific ZIP code) or *demographic (*age, gender, race, ethnicity, socioeconomic status); both are relatively simple to gather, thanks to the accessible tools like the U.S. Census and the objective nature of the data, and generally used to classify broad segments. However, demographic and geographic attributes are no longer enough for most suppliers, who have found that far more useful results come from understanding *psychographic* attributes like values, attitudes, opinions, aspirations, and interests, and *behavioral* attributes like what products people actually buy and how they are used. For example, Porsche sells their cars primarily to a demographic segment – male college graduates over age 40 who earn more than $200,000 a year – but in order to boost sagging sales in the 1990s, they identified five psychographic segments

including "Top Guns" driven by power and ambition who want to be noticed and "Fantasists" for whom a luxury car is an escape and a bit of a guilty pleasure. Porsche tailored its marketing and advertising according to these different segments, and sales skyrocketed[3]. On the behavioral front, online retailers like Amazon.com use recommendation engine software to monitor and analyze users' behaviors – including what they search for and what they end up choosing – as a way of predicting future purchasing decisions and making recommendations accordingly. The promise that such software holds for increasing sales is so high that Netflix just awarded a $1 million prize to a group of developers who came up with a more successful algorithm for such recommendations.

These examples show how segmentation analysis can lead to a tighter fit between what suppliers offer and what consumers want, particularly when it goes beyond basic geographic and demographic data to get at the heart of people's motivations. Because psychographic and behavioral data are more subjective and nuanced, though, they are harder to gather and interpret, requiring the use of sophisticated tools like surveys, focus groups, product demonstrations, and interviews. Moreover, it takes a big dose of judgment and a lot of energy to capture and interpret this kind of complicated data. As such, most industries have a bevy of market research and analysis firms that focus on gathering and analyzing information about demand, and businesses stand ready to pay them top dollar for this "customer intelligence." For example, in the technology sector, Yankee Group focuses on demand for telecommunications products and services, while other firms like Forrester Research and Gartner gather information about a wide array of technology markets.

At its best, market segmentation is on part of an ongoing, data-driven cycle of learning and adaptation. New companies often emerge to fill the gaps that such analysis identifies, while

existing companies use it to determine how they might tweak existing products (or just the marketing of them, as Porsche did) or whether to introduce new ones. In either case, suppliers may choose to use the results of segmentation analysis to serve one or multiple segments in a one-size-fits-all way (by offering a single product with no tailoring beyond it) or to serve different segments with different products or brands. For example, while a local bed and breakfast offers the same experience to all travelers, Hilton Hotels operates a wide portfolio of hotels, ranging from Hampton for "value conscious and quality minded travelers" and the Doubletree for business travelers to the high-end Waldorf Astoria brand. In either case, businesses have found that it behooves them to be clear about what segment they are serving, to understand deeply the needs and preferences of that segment or segments, and to tailor their marketing information accordingly. It is the rare business that aims its product or service blindly at whoever might stumble upon it.

Moreover, it is becoming increasingly possible for suppliers to serve individuals in a tailored way, ranging from news websites that allow users to choose the topics their page will display to Converse shoes allowing customers to design their own athletic shoes online. The economy as a whole – fueled in part by technology advances – is moving simultaneously toward a more global, far-reaching playing field and toward more personalized or niche treatment of individual groups and customers on that field. As such, market segmentation no longer requires companies or other organizations to default to targeting customers that are geographically close, nor does it mean that they need to go only so far as to differentiate between large groups. It is now possible to serve the diverse needs of many customers in many places and in very individualized ways. These dynamics are playing out in public education as well, albeit much more slowly and too rarely informed by segmentation data about the differences in needs and

preferences among students, parents, and teachers. Although the one-size-fits-all mentality is eroding, with more support than ever for increased differentiation and even specialization, the shift has been fraught with resistance to the idea of intentionally treating people differently. In the next section, we'll take a look at how the public education market is structured and how better segmentation could help alleviate this anxiety in the service of greater effectiveness and efficiency.

Segmenting Demand in Public Education

To apply this framework to education, it is important first to acknowledge some of the ways public education is – and isn't – like a classic market. Public education is both a public and a private good, which introduces a legitimate tension about the extent to which it should prioritize the needs of society and communities as a whole, versus the needs of individual students. Also, scholars Mark Schneider and Paul Teske have pointed out that "schooling is characterized by only an indirect link between the payment for and the receipt of the service, which blunts some of the power consumers have over private goods, such as the ability to withhold payment."[4] Another dynamic that distorts the system is the lack of a user- or learner-centric approach in policies and buying decisions. For example, state textbook adoption processes and purchasing cycles often adhere to timelines and criteria that reflect the state's ability to consider or purchase materials, rather than the pace of change in the content or the needs of teachers – let alone student utility. Despite these complicating factors, analyzing "supply" and "demand" in education is still a useful way to increase the diversity and responsiveness of our approaches.

The education market looks something like this: states are divided up into districts, which then operate some number of public schools. By default, students generally attend the public school in their neighborhood, so that the "buying decision" is based on where their parents have decided to live. However, parents and students aren't the only consumers, nor are schools the only suppliers. Districts and schools buy products and services from outside providers, so in that equation they become the demand, with vendors of things like transportation services, student meals and classroom computers as the supply. Yet another conception of supply and demand in education has to do with educators themselves: though few currently think of them this way (a problem we'll return to in a moment), current and prospective teachers and leaders are the customers of preparation and certification programs, and in choosing what school they want to work in. Across this landscape, notions of "supply" and "demand" are complicated, and who is playing which part depends very much on which part of the market dynamic is under consideration. For the most part, education policy is arranged to support the conventional view of the education market, with federal, state, and local dollars flowing to local education agencies and then to physical schools, with districts and schools spending the vast majority of their funds on staff, and with other monies used to procure products and services from outside providers for things like materials, transportation, food services, and so forth.

The growing number of entrepreneurial education organizations has begun to unsettle this familiar marketplace. In our prior work, we have defined education entrepreneurs as innovators that have a vision for a better way of doing things despite the constraints of existing rules and resources; they create new nonprofit or for-profit organizations to realize this vision, and through their success, they redefine our sense of what is possible, inspire others to follow, and inform changes to policies[5]. Across the public education landscape, entrepreneurs are challenging

familiar roles and expectations that we have for what students can achieve, what teachers can accomplish, what role schools and systems should play in supporting student success, and what other tools are necessary. In some cases, these organizations are doing things differently in relatively familiar roles, such as operating public charter schools in place of district-operated schools, preparing teachers and leaders for roles in such schools, and creating smart student assessment and analysis tools that address needs left unaddressed by large education publishers. Often, these organizations disrupt the old dysfunctions in the education market by taking a more user-centric approach, such as the way charter schools must market themselves to parents in order to secure student applications. This trend is on the rise as an increasing number of families choose to supplement their student's education with additional content or even attend entirely virtual schools. When it comes to entrepreneurial supply, therefore, the question of who the relevant "demand" is, and how it might be segmented, comes down in part to the kind of approach the organization is taking. What most of today's most promising entrepreneurial education organizations have in common is a shift toward a more user-centric approach, often anchored in the use of data, as a way of improving outcomes for students. However, they differ in whether they are appealing to parents (to choose their charter school over district offerings, say, or to choose their tutoring service), teachers (to choose their preparation program), school systems (to choose their content, product or service) or some other consumer.

Before turning to the ways in which market segmentation can inform smarter supply in public education, it is important to consider one final dynamic that makes education such a complicated market: the role of choice. As noted earlier, markets work best when buyers have the option to make other choices – otherwise, while there will still be suppliers and users, there will be little dynamic or responsive interaction. Economist Albert Hirschman has explained how

organizations' ability to improve hinges on the interrelated ability of members, citizens, consumers or employees to exercise "voice" in attempt to effect change or to "exit."[6] This holds true in education, and has been a subject of heated debate. Many have resisted allowing parents to more actively choose a school for their child, and public policies like certification regulations and collective bargaining agreements make it difficult for administrators to choose the staff that maps best to their needs. School choice supporters tend to trust that competition will motivate improved behavior by suppliers, while opponents often distrust markets as evil, impersonal forces that benefit only the wealthy. Both of these conceptions miss the point. As inconvenient as it is for pure free-market supporters, markets actually require quite complex and thoughtful regulation – witness the recent developments in the financial industry[7]. Meanwhile, those who fear market forces fail to consider the potential for choice to have a broad positive impact on a system, which can be made more dynamic and responsive through the existence of competition.

It's not just the abstract system that benefits, though – individual participants reap the rewards. Organizations simply work better when the people who gather within them agree on a common purpose and approach, and they ignore this reality at their peril. When people gather in an environment to work together (as teachers do) or learn together (as students do) and they have divergent ideas of what they should be accomplishing or how they should be operating, leaders and managers must spend a lot of time and energy trying to resolve these issues. This misalignment often masquerades as disgruntled employees or customers, but because it is deeper than that, it often detracts from actually doing the work and makes it that much more difficult to achieve positive outcomes. Choice, together with clear information about what's involved in making that choice, is a proactive way to channel energy away from attending to the "squeaky wheels" and toward actual learning.

We believe choice is also critical for a third important reason: it increases the agency of the stakeholders who make these choices. The ability to make choices is crucial to our sense of well-being and our motivation, which leads to increased engagement – exactly the sort of behaviors we hope to increase among teachers, parents and students. "Choice has a clear and powerful instrumental value: it enables people to get what they need and want in life," notes author Barry Schwartz in his book *Choice and Happiness*. "Freedom to choose [also] has what might be called expressive value. Choice is what enables us to tell the world who we are and what we care about." Research has shown that the very act of choosing leads people to demonstrate an "escalation of commitment"[8] to what they have chosen. Moreover, the lack of choice can lead to what psychologist Martin Seligman has called "learned helplessness,"[9] a belief that one has no power to influence an outcome, which leads an inability to take action *even* when circumstances are changed and the opportunity to choose is offered, and has been linked to everything from poor health to low academic outcomes. As such, inherent in our analysis of how market segmentation can inform smarter supply in education is an implicit assumption that doing so will yield the most benefit if users – whether students or educators – have a choice in the matter.

Perhaps due to the legacy of "tracking" and other systems that were misused as tools of bias and exclusion, we've been reluctant as a field to get beyond the surface similarities within our public school communities and really understand the differing needs and priorities that might benefit from being addressed in different ways. Likewise, we have ignored the different types of skills and strengths among teachers and school leaders and have shied away from creating diverse approaches to preparing and supporting them. However, we are at a unique moment in education in which a better understanding of the characteristics, needs and values of students,

parents and educators can have a significant impact. Policies like No Child Left Behind have pushed us toward disaggregated student data and have put a spotlight on the unaddressed needs of entire groups of students. The current administration is building on that by pushing for fewer, clearer and higher common standards, more sophisticated assessments, and a stronger data infrastructure that will support measuring student need. At the same time, frustration with the pace of improvement in traditional schools has made low-income communities more receptive than ever to innovative approaches to learning, and technology has likewise made it possible for entrepreneurs to experiment with such approaches in an affordable way.

Indeed, it seems we are finally moving away from an almost universal acceptance of "one-size-fits-all" toward increasing differentiation and even specialization of the means we use to achieve our educational goals. In order to better understand how improved market segmentation can help usher this forward, we will consider three different areas of the education market. First, the labor market for teachers and leaders is largely construed as one-size-fits-all and so will serve as a case study for where little segmentation and responsive supply has happened and where there is a great deal of work ahead. Second, some differentiation has begun to occur in the realm of school options for parents and students, but such differentiation in supply has not generally been mapped to actual demand among parents and students. Finally, we will consider the trend toward more personalized learning that is targeted directly at the needs of individual students, which implies both a detailed understanding of preferences, motivations, and needs, but also a similarly granular approach to how other resources would need to be reconceived in order to support those needs.

One Size Fits All: Educators as Widgets

It is somewhat shocking that the slice of the education market that still clings the most to the one-size-fits-all mentality is the market for teachers and leaders. Despite the fact that we are dealing with professional adults, who are mature enough to choose a profession, select a course of training, and find a place of employment, we constrain these choices at every turn. Moreover, as The New Teacher Project showed in its recent report, "The Widget Effect: Our National Failure to Acknowledge and Act on Differences in Teacher Effectiveness," even once teachers have found their way into a classroom, we persist in treating them as interchangeable in the way we evaluate them, with less than 1 percent of teachers receiving unsatisfactory ratings and half of districts studied not dismissing a single teacher for poor performance in the past five years. It is absurd to pretend that teachers are interchangeable widgets that can be prepared in the same way or moved seamlessly from one environment to another, yet that is just what we do today across teacher preparation programs and most districts. Given that education is a service business where the vast majority of operating budgets are allocated toward salaries, it seems absurd that we don't yet segment this market in a way that would enhance preparation and licensure and engender more productive working environments that correspond with the diverse needs, preferences and skills of educators.

The failure to recognize educators' diverse needs, preferences, and skills begins with preparation. The vast majority of traditional teacher education programs treat teachers in a one-size-fits-all way, beyond the generic variables of what grade level they want to teach and what subject matter they might specialize in. Regulation distorts market forces here, causing these institutions to behave as though their customer is neither their students (or, for that matter, the students those teachers go on to instruct) nor the schools who hire their graduates, but rather state certification and accreditation regulators. With a few notable exceptions, like the Stanford

Teacher Education Program (STEP) focused on teachers who want to serve diverse populations and Columbia University's Klingenstein Center for teachers who want to work in independent schools, few higher education institutions proactively identify a specific market segment or niche to serve. Fewer still gauge the demand among prospective teachers for instruction in specific pedagogical approaches, nor do they consider the demand among placement schools for different types of teachers or skills. Perhaps even more troubling, few preparation programs bother to track and assess their own effectiveness over time, as measured by their graduates' ability to bring about successful student outcomes.

Entrepreneurial providers have made some progress in this market. On one end of the spectrum, new online providers of teacher education like Capella, Western Governors University and 2Tor consider their primary customer to be the aspiring teacher, and thus emphasize priorities like convenience. Some observers fear this comes at the expense of quality, and call for these providers to consider school placement sites as customers whose satisfaction and outcomes should also be tracked. On the other end of the spectrum, new preparation programs anchored in specific charter school models like Teacher U (born out of the needs of Achievement First, Uncommon Schools and KIPP) and High Tech High Graduate School of Education (housed at San Diego's High Tech High, the first charter school authorized by the state of California to fully credential teachers) consider placement schools as their primary customer, and thus take a highly specialized approach to selecting and preparing teachers for success in a specific kind of work environment. We don't yet know if this placement-based approach is more effective, but many of these entrepreneurial providers are tracking their graduates to measure whether such alignment and customization leads to better teacher performance and better student outcomes. Some segment their customers according to the specific types of educators they believe will be

successful in their program and beyond. For example, from the moment she started Teach For America in 1989, founder Wendy Kopp was clear about the segment she sought to recruit into education: young leaders who were community-minded and who would help reform education over their lifetime from whatever career they ended up in, and who would begin by committing to teaching at least two years in an under-resourced classroom. As such, TFA focuses on the demographic of recent college graduates that bring psychographic traits like an internal locus of control, a passion for community service, and a high degree of "grit" or tenacity. Over the last 20 years, they have found that these characteristics correlate with effectiveness in the under-resourced classrooms that TFA places them in, and makes them more likely to carry out TFA's longer-term mission of public service.

Once educators have been certified or credentialed, there is equally little differentiation applied to the demand among educators for work environments. Currently, educators are segmented primarily by grade level (elementary versus secondary), subject, and students taught (comprehensive, Advanced Placement, special education), and beyond that by compliance-oriented mechanisms like certification, years served, and tenure. School systems generally resist further segmentation of educators based on management style (their own and the type of management structure they work well within), preferred pedagogy, and desired school culture. However, as former Gates Foundation official and teacher David Ferraro has described[10], allowing educators to make active choices among schools can help to create much more effective and productive work environments by aligning them with colleagues and organizations that match their deeply held values and beliefs – and that's before we've even tried to match them with roles that take advantage of their actual skills. Certainly, some teachers are more motivated and successful in a highly constructivist environment while others might prefer a more structured

one, and some prefer to design much of their own curriculum while others might prefer to follow an established set of lessons and assessments. Moreover, these preferences may very well change over time as an educator becomes more comfortable with the craft of teaching or as their lifestyle changes.

Although we have begun to invest energy and resources in measuring teacher and leader effectiveness, most of that work mistakenly assumes that "effective" is more or less the same in all environments. Pragmatically, good educators understand that these differences exist, and good principals seek to hire teachers who are a good fit with their school model, culture, management style, and values, just as good teachers seek to find schools and leaders aligned with their own preferences and talents and values. Charter school management organizations (CMOs), have embraced this mindset, understanding that the clearer they are about what their school stands for and how it will operate, the more likely they are to attract and retain professionals who actually want to be in that environment and can be successful there. Based in large part on our work with entrepreneurial organizations developing new approaches to preparing educators, as well as with nearly two dozen different charter management organizations, we believe that a better understanding of the underlying preferences of the labor market for different work environments – preferred pedagogy, culture, team values, operating principles, work schedules, structure of the day and year, leadership styles of principal, and compensation approach – would dramatically improve productivity and satisfaction on both sides of the equation. "If we knew [what their preferences and skills were], we could create schools and work environments to maximize productive and happy teachers, which we know equals great gains for students," agrees Kaya Henderson, deputy chancellor of District of Columbia Public Schools, who oversees the district's human resources work and helped other urban districts improve teacher hiring while

at The New Teacher Project. "This would also force us to make sure we have a portfolio of options for teachers the way we are working to have a portfolio of diverse options for students."

What's more, such analysis should be conducted and tracked over time, in order to figure out if there are some stable segments of the market we should be treating differently to improve effective instruction and strengthen student outcomes. Are there relatively stable segments of educators who want different environments, or do their preferences adjust in tandem with changes in their skill level or lifestyle outside of work? Some research does segment teachers into newer or younger teachers and older, more experienced teachers, and examines differences in opinions and attitudes. But as longtime market researcher Steve Farkas told us, "one of the things we most need to know is: what are the characteristics of the segment that stays motivated and continues learning and pushing their practice over long periods of time?" This is the kind of information that could help us understand what types of environments would draw educators in and keep them engaged. A recent study from Public Agenda and Learning Point Associates, "Teaching for a Living: How Teachers See the Profession Today," took a step in the right direction, segmenting current teachers into three psychographic clusters: the "Disheartened" who tend to feel unsupported by their school's administration, the "Contented" who see teaching as a lifelong career, and the "Idealists" who see teaching as a way to help underserved students get ahead, but are likely to move on to other careers. The report encourages school systems to consider how to address these groups in different ways, determining how best to support Idealists' passion with skills and resources, while determining whether the Disheartened are in the wrong career or just the wrong school.[11] Clearly, more and deeper such research must be done to probe into the behaviors teachers exhibit through the choices they make, the results of

the instruction they provide, and what that implies about how we might structure supply of preparation and working environments accordingly.

A few organizations are coming up with ways to identify good "matches" between teachers and leaders and the schools they choose. For example, the Haberman Foundation provides online surveys and interview tools that are intended to help school systems hire educators who will be more effective in serving low-income and at-risk students in urban environments, by tracking behavioral and outcomes data across a large group of educators in order to identify attributes that correlate with high success rates. Their "Star-Teacher Pre-Screener" can be combined with an interview protocol which they claim leads to a "95 percent accuracy rate in predicting which teachers will stay and succeed and which ones will fail or quit."[12] Still a relatively blunt instrument, in the sense that it considers all at-risk and urban environments as essentially the same, it nonetheless provides a greater degree of market segmentation analysis of the potential teacher and leader labor pool than these environments often have. Similarly, KIPP (the Knowledge is Power Program) has designed a leadership selection rubric to help them identify prospective leaders most likely to succeed in operating schools that follow the KIPP model and serve low-income students, and have refined this rubric over time based on linking these attributes with successful school outcomes. The rubric has 11 major characteristics, some of which are rooted in skills like communication, but many of which are psychographic attributes like "adaptability," "relentless achiever," "self-awareness," and "student-focused."

Better segmentation analysis of the education labor market might also allow us to do a thoughtful redesign of staffing models – including differentiation of the kinds of roles teachers and leaders can play, based on their skills and preferences. More in-depth understanding of how

different kinds of teachers spike in different ways – this one on instructing large groups, that one on coaching struggling learners one-on-one, another on leading teams of teachers, still another masterminding curricula or assessments behind the scenes – could lead to new ways of addressing instructional needs, and to innovative ways of mapping the diverse labor pool against those needs. Indeed, this differentiated approach to career progression is taking hold in the corporate sector, where "career lattices" that allow for employees to chart their own progress in a variety of ways are beginning to replace the antiquated notion of the "corporate ladder" with its rigid, linear path from one role to the next[13]. This could even allow schools to offer more flexible and part-time positions that could either draw back certified teachers in new roles or allow other talented people to contribute to schooling. A recent Education Sector report on school designs aimed at maximizing teacher effectiveness cited a number of promising new approaches, including the variety of community partnerships that Brooklyn high school Generation Schools has established, such as with the nonprofit organization ReServe, which places retired professionals in schools and other organizations. In a low-income Latino community near Boston, public elementary school Gardner Pilot Academy even has an "extended services director" on staff to coordinate the contributions of 15 community partners. "This kind of support, where aides and interns are assigned to oversee recess, lunch, and before- and after-school programs, means that teachers' work at Gardner can be designed almost entirely around improving instruction," notes report author Elena Silva[14].

Differentiation: Diversifying the Supply of Schools

　　In contrast to the lack of differentiation we apply to educators, we have slowly been increasing our recognition that students are different at the classroom and school level – and

there are some limited experiments to create differentiated options. In spite of this progress, there are too few examples of school providers who are segmenting the demands of students and parents (or educators, as noted above) as a way to inform the development of more effective and more diverse supply that is responsive to those demands. As enrollment swells or shrinks in a district, the response is usually to find ways to accommodate additional students in existing schools or to close entire schools, rather than using this as an impetus to get underneath the reasons for the enrollment change and determine how the system might adapt accordingly. Moreover, although entrepreneurial providers of schools like charter school management organizations are often more customer-oriented – creating a coherent and consistent brand to appeal to parents and educators, gathering frequent data about student progress and parent satisfaction – their models tend to correspond with founder ideology or experience rather than with specific knowledge about student and parent demand. So, ironically, although in aggregate they provide diverse supply to the market, individual entrepreneurial leaders often demonstrate the same kind of "one-size-fits-all" mentality that plagues district leaders, believing that their own model is the only one size that will fit right. In cases where schools have wait lists – a sure sign of demand outstripping supply – it is rare for anyone to mine the information on those lists, whether it be a district considering how demand for specialized magnet schools might inform its own programs or a charter school operator determining what kinds of unmet needs exist in a community. One researcher told us that he works with a district where roughly 75 percent of parents report considering a school other than their default, but when he asked for data on historical wait lists to analyze the specifics of unfulfilled demand, he learned that wait lists were managed at the school site and often discarded once empty seats had been filled with no attention paid to what this latent demand could tell them about how to adjust supply.

Some districts and entrepreneurial school operators perform limited marketed segmentation using the relatively blunt instrument of demographics. For example, charter school management organizations assess prospective neighborhoods and communities for their next school site based in part on an analysis of areas of high poverty and the low school performance that often correspond with that. In Montgomery County, Maryland, schools superintendent Jerry Weast segmented his community into a Red Zone and a Green Zone in an effort to differentiate between the needs of different parts of the community. Based largely on demographic information (that correlated to large and persistent achievement gaps), Weast used this simple segmentation to allocate resources differently across the zones in an effort to increase equity of academic opportunities[15]. The complex work of leading this community through this change was anything but simple, but the segmentation analysis itself and the overarching supply response rationale were relatively straightforward – using demographic analysis, apply more funds to the schools where chronic failure correlates with poverty and minority student concentration.

A more sophisticated approach can be seen in the districts that have instituted "mandatory choice" in which all eighth graders must actively choose a high school, as Boston and New York have done, and in those that consider themselves "portfolio districts" that seek to manage portfolios of schools rather than directly operating all of them, as cities like New Orleans and New York have done across the board and Chicago has done in a more limited way with its Renaissance 2010 initiative. Even in mandatory choice and portfolio districts, leaders have not yet segmented their market in a way that would inform a differentiated supply of schools for students, parents and educators to choose from. More often, leaders will create or seek out school models that are perhaps tailored to broad demand in a geographic neighborhood (such as around a failing school) or at a specific grade level, and then survey parents once a year to assess

satisfaction. In Boston and New York, mandatory choice has created more awareness of what supply is most popular among parents, and in some instances has begun to create a responsive adaptation by districts (with replication of a few popular college-prep high schools and the increase of programs like art or band), but neither has taken a systematic or proactive approach to optimizing the match between what it offers and what communities seem to want[16]. Meanwhile, researcher Paul Hill at the Center on Reinventing Public Education is working with a network of portfolio management districts, and indicates that they are most often responding to the school providers that approach them, not investing in market research to proactively consider how to meet parent and student demand with optimal supply. And no district we found was putting all of these parts together by applying this logic to better understanding how their labor pool of teacher and leaders mapped to parent and student demand.

The responsive supply mindset is taking hold first in areas where the traditional model has been most inadequate. For example, in New York City's District 79 – created to serve a demographic and behavioral segment of over-age, under-credited students – entrepreneur-turned-superintendent Cami Anderson and her team realized that "in spite of the fact that failing kids are often seen as a monolithic group, they are actually a quite diverse group." They set out to segment the 150,000 students in their district in an effort to dramatically improve outcomes by providing much more responsive supply. Their work built upon earlier efforts under the leadership of Michele Cahill, which began with an in-depth analysis of demographic and behavioral data that identified some predictive "triggers" for students who ended up in this situation, which led to the closing of some large comprehensive high schools that were responsible for more than two-thirds of this pool of students. At the same time, they identified that a set of "transfer schools" and other "recuperative" programs were having much greater

success, and so almost doubled the supply of these kinds of seats, including programs like the South Brooklyn Community High School, Young Adult Borough Centers, and revamped GED programs such as GED Plus and Access GED[17].

Moreover, when Anderson's team analyzed the transfer schools that were achieving the best results, they found that one key factor was the way they combined academic rigor with a case management approach to the social and emotional challenges of the students. They also found that that there were different psychographic and behavioral attributes that led students to be behind in credits, which in turn affected which kinds of interventions were most likely to be effective. So they pursued a more advanced market analysis to better understand these diverse segments of students. With the help of consulting firm Parthenon Group, they administered a student survey with more than 4000 respondents, which uncovered three primary segments of students: those who had real and significant learning challenges, those who were reading and thinking at high levels but were behind in credits for some reason (ranging from too little time in class to low test scores to significant social or emotional issues), and those whose challenges stemmed from some major life event like the death of a parent, a pregnancy, or being a victim of violence. Following up on this general segmentation, District 79 performed in-depth focus groups with more detailed sub-segments, such as girls who had dropped out to have babies and then returned to school, in order to better understand what kind of responsive supply might have kept them in school all along. In that particular case, they learned that guidance counselors had advised these girls to drop out once they became pregnant; however, these girls shared that after becoming pregnant, they felt an even greater appreciation for the importance of succeeding in school and what they needed was someone to push them not to give up, as well as some adaptive

services like study groups and mentoring by other girls who had succeeded despite pregnancy.

As Anderson describes:

> We decided to close the schools that offered segregated programming with really poor outcomes, and to invest the money in the Living for the Young Family through Education (LYFE) program – school-based childcare centers with a dual mission of providing access to excellent early childhood experiences so parents can stay in school while helping them transition successfully to parenthood, and a toolkit of resources for principals to help student parents stay on track towards graduation *in their schools*. The focus groups helped to sharpen the action plans for both – still very much works in progress. For example, many of the students' quotes and suggestions (and ultimately live interviews) will appear in the tools for principals. As another example, many of the LYFE centers are piloting parenting groups/curricula in response to the expressed needs of the students.

Though efforts to create a more diverse supply of school environments has been helpful in better meeting the varying needs of students, parents and educators, too often this differentiation has been based not on data-driven analysis, as in the District 79 example, but rather on the intuition and ideologies of those making supply-side decisions – including district and charter school system leaders, school leaders, and philanthropic funders who choose which school models and networks to support. Billions of dollars have been invested based largely on hunches about what teachers and parents want and what students need. This has led to a market of school supply that combines various mixtures of pedagogy, school culture, content emphasis, and activities into loosely differentiated models. There is a spectrum based on pedagogy and culture that ranges on one end from credit-recovery and some other out-of-school and internship models for disconnected youth, to experiential learning (such as Outward Bound), to constructivist or project-based (High Tech High, Big Picture Company, Envision Schools) and then at the other end of the spectrum the more structured programs like Achievement First and KIPP, with the rare blends of traditional and progressive like Aspire Public Schools sitting in the middle of the spectrum. Other kinds of differentiated supply include specialized approaches such

as single-sex schools (Excellence Academy in Brooklyn, The Young Women's Leadership School of East Harlem) and content-specific schools like the Denver School of Science and Technology.

Despite the flocks of parents on wait lists and teachers who have been attracted to these schools and others, we don't really know whether we have the right mix and proportion of models to reflect the priorities and desires of parents, the learning needs of students, or the working styles of educators. When we created NewSchools in 1998, we hypothesized that there was a very diverse underlying demand among parents, students and educators, and have since invested a great deal of time, energy, and money in supporting a variety of charter school management organizations (CMOs) in low-income communities. However, we have not been able to raise philanthropic funds for corresponding market research that would explain the demand-side perspective such that we could map supply accordingly, nor have we seen anyone else take on this work, outside of rare exemplars like Edmonton, Canada. As a result, we simply don't know what portion of urban parents want a constructivist school environment or a more traditional one, or how many would prefer single-sex schools or subject-specific schools, let alone what proportion of students are positioned to best succeed in these and other models. Is the popularity of traditional school environments – as measured by heavy applications for any new school opened by KIPP, Uncommon Schools and Achievement First – a reflection of true parent demand, or of a limited supply of quality options? We simply don't know.

In this section, we have focused largely on parents as "demand" for whole schools because they act as proxies for student need and it is their actions that often dictate what school students end up in – whether by residential choice or specific school choice. The little research that has been done in this area has indicated that for parents, the act of choosing a school for

one's child is quite complicated and involves many values-laden considerations, as well as personal judgment about what environment might best serve the child's needs. Some have hypothesized that there may be a "hierarchy of needs" akin to the one psychologist Abraham Maslow developed for basic human needs, where survival and safety must be attended to first, followed by social interaction and then individual accomplishment. Similarly, they hypothesize, parents attend first to the immediate safety of their children, and beyond that begin to differentiate along values-based lines. There is little research to determine what needs fall next in line and why – academic quality, convenience, school culture, extracurricular options, diversity or homogeneity of the school's population, etc. All of these qualities probably matter, but in very different orders for different "customers." In order to inform smart supply among those who make decisions about providing schools to students, parents and communities – including districts but also entrepreneurs and their funders, and policymakers like charter school authorizers – we need market research that is sophisticated enough to combine both empirical evidence-based preferences and more subtle values- and personality-based preferences. At that point, there may well be a public policy debate to be had about whether to meet that demand head-on or whether to take a page from behavioral economists like Cass Sunstein who might encourage us to "nudge" parents towards the most effective environment for their students. However, we can't even engage in a productive debate until we understand where parents, students, and educators are actually coming from.

Specialization: Personalizing Learning for Students

At the far other end of the spectrum from a "one size fits all" mindset is personalized learning, which harnesses technology advances to deliver educational products and services

directly to students and teachers, and either meets a specific need by design or can be customized "on the fly" to do so. This vision was perhaps best laid out by author Clay Christensen in his book *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*. "The proper use of technology as a platform for learning offers a chance to modularize the system and therefore customize learning," he writes. "Student-centric learning opens the door for students to learn in ways that match their intelligence types in the places and at the paces they prefer by combining content in customized sequences."[18]

While technology has facilitated this movement towards specialized or personalized learning, it is also motivated by the recognition that despite the progress that public schools have made over the last several decades, there are still too many students whose needs are not being met, particularly in low-income communities where few read and do math on grade level, and even fewer graduate and go on to receive the college education we know they'll need to succeed in the knowledge age of the 21st century. This dynamic has also had an impact at the other end of the spectrum, where our intense focus on improved equity has in some cases meant less attention and resources directed towards the most advanced K-12 students. The pace of this change is being accelerated by a policy environment supportive of common standards and assessments – along with advances in technology that make it far cheaper and easier to build, maintain and distribute sophisticated software – which together make it more possible than ever for entrepreneurs and other innovators to devise creative ways of addressing very diverse student and educator needs through content, tools, assessments, support services, virtual schools, "hybrid schools" that combine offline and online elements, and other approaches we haven't yet dreamed of. Done right, these shifts could also generate more data about the needs and preferences of

parents and students, and therefore help us better understand the different segments of demand, which could in turn lead to dramatic improvements in productivity and academic success.

In some ways, this trend is a natural progression from the increasing differentiation of instruction at the classroom level, in which a teacher groups the many students in their class as a way to acknowledge the different pace at which they may master content or the response they may have to different instructional strategies. This development has been increasingly coupled with "adaptive" software tools that allow the pace of instruction and assessment to be hastened or slowed based on student progress, and for teaching modalities to shift based on student responsiveness. For example, Carnegie Learning created a "cognitive tutor" for algebra that recognizes the different kinds of mistakes students make along the way and adjusts instruction accordingly. A more recent example is Apangea Learning, which uses a huge database of historical student performance data to track individual behavioral patterns and provides real-time human tutoring online once a student has maxed out his potential for self-directed computer-generated tutoring. Generally, these approaches allow educators to treat individual students in a more personalized way, but within the traditional staffing, management, and policy environment.

Meanwhile, an increasing number of parents have expressed their dissatisfaction with the public school structure itself by either choosing to home-school their children, enroll them in "virtual" schools or programs online, or supplement their school experiences with some sort of out-of-school instruction; the former two categories alone account for more than 2.5 million students – compare that with just 1.5 million students enrolled in charter schools[19]. This trend speaks to an increasing sense that students should be treated as individuals, and that traditional "schools" are not necessarily the best way to meet their needs. Historically, schooling has meant that resources and personnel have been concentrated in the same geographic place as the student

and all of his or her learning. The increasing openness of parents and students, combined with the increasing sophistication and affordability of technology, is enabling these elements to be "unbundled" and could enable a much more "a la carte" approach to public education – and with it new concepts of how to learn, to teach, to supervise, to lead, to allocate resources, to sell products, and to provide services. "When I think about where we are going to be in 50 years, I think we are going to have a marketplace model for education where the student is in control of their education and they determine who is going to educate them, when, where, and how," said venture capitalist Fred Wilson at a recent conference called "Hacking Education" that his firm Union Square Ventures hosted on the subject. "I'd like my kids to be able to avail themselves of the quality classes and teachers they have in their physical space but then opt out of those [classes] that aren't good and go get that knowledge somewhere else."

For example, a state might allocate to each child a "weighted formula" of funds based on their socio-economic and learning characteristics, and then educators or parents might be able to use these public funds to select a customized combination of educational services rather than have them simply be directed to a single school. The parent or learning advocate might have either a general roadmap of subjects that would need to be covered over the course of time in order to meet state standards or an individual education plan, and then might choose within that framework a variety of content and services in keeping with their child's needs. For example, they might choose online foreign language instruction from Rosetta Stone, advanced placement math from Apex Learning, college counseling services from College Summit, science lab simulations from Lockheed Martin's Virtual World Labs, courses in accounting at the local community college, and so forth. What's more, technology can be harnessed to ensure that content is meeting the needs of individual students: the software platform developed by startup

Guaranteach allows the user to choose online math instruction videos based on their preferences for simpler or more complex concepts, fast-paced or slow-moving tutors, verbal descriptions or pictures. The idea is that the user in this scenario (the parent, on their child's behalf, and in consultation with their child as appropriate) would become more of an active shopper, cobbling together the various parts of an education from different suppliers using public dollars.

This kind of "modular" system would enable learning to be highly customized in both the individual parts of instruction and how they come together to form a coherent education. Having a parent do the work of assembling the pieces isn't the only way to conceive of this, though. A state, district, school, or educational advocate could take a more modular approach to managing providers of instructional services for the students under their supervision (just as they manage providers of services like food and transportation today). For example, at the limited end of the spectrum, the Florida Virtual School is already serving 70,000 district students in 150,000 classes, initially filling gaps in curriculum options at traditional high schools in the state rather than operating as a degree-granting institution, and more recently moving into the role of complete virtual school of record. The school receives per-pupil funds for those students who successfully complete and pass their courses, making the school more responsive to student demand and accountable for results than many traditional schools. Meanwhile, the school district of Alpine, Utah has created a hybrid approach, establishing an online K-8 school to support its home-schooled students using courses from K12 Inc. and other online school providers rather than developing its own curriculum, which allows them to quickly switch providers for specific subjects when necessary.[20]

As content is delivered from multiple providers in a variety of configurations, we will need dramatically different approaches to assessments and the traditional notions of "courses"

and "credits." Education professor Frank Smith described a system like this more than two decades ago, as "a system like a 'student outcomes ATM-card' for tracking progress and data management. As they demonstrate performance mastery, students could swipe their 'ATM card' at various school and community locations to keep track of their progress." What was a futuristic story two decades ago is now close to what the state of New Hampshire is rolling out as they combine new staffing and assessment approaches to better support Extended Learning Opportunities for high school students. Students can learn from independent study, private instruction, performing groups, internships, community service and online courses, and participate in new competency-based assessments that determine whether students really are learning in this new context[21].

Perhaps the most sophisticated and far-reaching version of this customized environment is the School of One (SO1) in New York City. This summer, the district piloted the School of One inside an otherwise ordinary middle school. Parents and students selected the school, but then, students equipped with laptops worked in different configurations throughout the day – individually and in groups, with a laptop or with a teacher. End-of-day computer-based assessments determined what the next day would bring for each student. The model is still early and so far only covers math, but founder Joel Rose (chief executive of the department's human capital office) envisions that a technology-based learning platform at the heart of the School of One would eventually gather student information (learning styles, preferences, interests, progress), analyze the school's resources and constraints (teachers, content, physical space), and generate a tailored "playlist" of learning activities for each student, with teachers recast as much more specialized instructors. This could be a radically different way to deliver a more personalized learning experience to students, based on their unique academic needs, learning

styles, and motivations – and to use teachers in a more differentiated and focused way, allowing them to take on more specialized roles based on their own content expertise, instructional style, and skill level. In fact, early indications show that the "playlist" algorithm ensures that students have already mastered precursor skills and content before each new module, which allows teachers to focus on their current lesson without having to juggle between students who are ready and students who really are not yet ready for the current lesson, which has led to increased productivity and satisfaction.

Certainly, staffing arrangements can and should be adjusted to make the most of more personalized learning environments, and could allow resources to be allocated in new and creative ways. Supervisors or coaches – a competent adult with less instructional expertise than a teacher, and likely less expensive as a result – could oversee the progress of a group of students learning online; certified teachers might even be able to supervise slightly larger classes given the personalization of technology-enabled learning. California charter school management organization Rocketship Education is experimenting with this kind of creative staffing in order to reallocate resources to other school needs. It may even be feasible for some students to be paired with a rigorous technology-based instructional program and a case worker or other adult whose skills more closely match the needs of disconnected youth with significant emotional needs. Historically, our system tries to split these students in two, asking certified teachers to "teach" them in one setting, while a case worker or coach helps them address their emotional needs in another setting, but integrating these services might better meet the needs of these students.

Unbundling educational supply – either entirely or partially – creates the opportunity for an incredible diversity of supply to meet very specialized segments of student need. This is happening throughout the economy in a phenomenon described as the "long tail" which is a shift

away from a model focused on the popularity of a small number of "hits" that appear initially to

make up the bulk of sales (in the "head" of the demand curve illustrated in Figure 1), towards the

aggregate number of niche sales (in the "long tail") that in the end actually add up to a greater

sum.

Figure 1. The Long Tail.

Source: http://www.longtail.com/the_long_tail/about.html

"In an era without the constraints of physical shelf space and other bottlenecks of

distribution, narrowly-targeted goods and services can be as economically attractive as

mainstream fare," writes author Chris Anderson, who popularized the concept in his book *The*

Long Tail. "People gravitate towards niches because they satisfy narrow interests better, and in

one aspect of our life or another we all have some narrow interest (whether we think of it that

way or not).[22] It is likely that this personalization will lead to much greater effectiveness for

public education, particularly for students with special needs that are difficult to meet in a

"bundled" school environment that often needs to aim its resources at larger groups of students in order to be cost-effective.

Conclusion

No one in education actually argues that "one size fits all." However, there has been too little acknowledgement of diversity among and across stakeholders in public education, too much reluctance to address that diversity by investigating characteristics, needs and preferences, and not enough of the cultural shift we need to adjust the way we deliver education to more dynamically optimizes productivity, effectiveness and satisfaction for both educators and students. Too often we create policies that place the onus for personalizing education on educators and parents, but without giving them the context, the resources or the support they need to do this well. Educators do a heroic job of trying to navigate the different skill levels and learning styles of their students, often in a school structure that runs counter to the way they prefer to work and alongside colleagues whose philosophies and approaches to education may be different. Meanwhile, we give most parents just one high-stakes moment to choose the public education environment that will serve their student best – when they choose a home – even though we know that choice is bound up in other requirements ranging from the job market to where their extended family is located. After that moment, they must be vigilant to ensure their child's needs are being met, and only in rare circumstances will they choose to go through the laborious process of finding supplemental services, let alone switching to a different school.

It is incumbent on those who provide public education and create new supply – whether that is the public policymakers who establish the rules and regulate funding streams, the foundations that support new supply, or the entrepreneurs who are busy devising innovative new

approaches – to figure out how to account for and address the diverse needs and preferences of educators and students. This implies public policies that support a more comprehensive approach to data, that invite both parents and educators to make more choices, that conceive of content as more than textbooks and learning as delivered by organizations other than local education agencies (LEAs) and schools, and that allow funding to flow in more user-centric ways, such as weighted student formulas.

What's more, we will also need to invest in the systems and infrastructure needed to make this shift. For example, current assessment models that are largely annual summative tests that rely on one delivery methodology (pencil and paper bubble scans) will become less relevant as education shifts to become more dynamic, more tightly attuned to interim and formative assessments, and more responsive to specific needs and modalities (including things like computer delivered simulations). We will need new approaches to assessment that allow students to demonstrate mastery of individual learning "modules" at their own pace, as well as systems that can track this progress in a non-linear way and across a variety of potential learning environments – in school, at home online, in a workplace and in the community. In addition, we will need robust technology infrastructure on the supply side to help deliver content, organize resource allocations, allocate instruction and supervision in new ways, and ensure quality oversight of an increasing number of education providers.

Indeed, this shift toward increased differentiation and personalization thrusts education's myriad stakeholders into new roles. School systems and schools will need to focus more on developing strong academic standards and acting as arbiters of educational quality, but not as the sole providers of instruction. Teachers and principals would no longer be cogs in a standardized system, but true professionals who are able to act on their preferences and maximize their

contributions in a variety of ways. Parents would exercise not just residential choice and then agitate for the best opportunities within a monopolistic framework, but would wield greater degrees of freedom – and responsibility – to choose between whole schools and tailored programs for their students. Even students themselves would become more engaged participants in designing their own educational opportunities from a raft of possibilities. However, these new roles could quickly spiral into an unmanageable set of choices if we're not careful about how we aggregate and present information. Scholars of choice have found that people can be easily overwhelmed not just by the sheer number of options, but also by difficult or complex choices that have weighty consequences. For instance, one study showed that while most people say they would want control of the very personal issue of cancer treatment, after diagnosis almost everyone actually prefers an expert to tell them what to do.[23] We will need to strike a delicate balance between an increased number of options and the complexity of those decisions, and come up with ways to present information in much more transparent and user-friendly ways.

Rather than guessing about how this might work, we should begin immediately by identifying what parents, student and educators want, both by actually asking them and by offering pilot experiments that show them how such options would actually work, then tracking how they actually behave and what it tells us about the kinds and degrees of choice they actually want to exercise, and what the benefits and tradeoffs are. This implies near-term investment by the public, philanthropic, and even for-profit sectors in market research studies and firms, and in starting and growing expert information sources patterned after organizations like Consumer Reports and JD Power & Associates that provide unbiased and detailed recommendation information to consumers of retail products like cars and electronics. These efforts must be supplemented by investment in the kinds of robust data systems needed to manage this

information, and in a wide variety of small providers that can test out new niche approaches to instructing students and preparing educators. Ideally, this would all lead funders to invest in a greater diversity of school providers and more diversified supply of adaptive and modular learning tools that address demonstrated needs and stated preferences, especially if there is data to show that such responsive supply leads to smarter use of philanthropic and investment resources – and greater outcomes for students. However, in the short term this may require for-profit capital providers to make a greater number of smaller investments – which is at odds with how venture capitalists prefer to work -- and philanthropic funders to support riskier experiments than foundations generally prefer to support.

Once we have better data about what such differentiated efforts look like and lead to, we can then engage in broader discussions about modularization and personalization of the public good called education. Would it be the most under-served who would thrive by customizing their education – which could be a major improvement for productivity overall – or would it be only the most technologically savvy and empowered learners who simply want to advance their own progress? Is the promise more about increasing equity by meeting the needs of those who the current system is failing, or about increasing the adaptability of the system so that it accelerates the pace of learning for all students, including those who are advanced and those who are struggling? Certainly, since personalized education generally involves more independent work and individualized choices, many will be concerned about the weakening of public schools' role in creating a coherent society out of many diverse communities. There will also be some who believe that having students attend neighborhood schools and having teachers instruct groups of students face-to-face is necessary for social and emotional development. These are legitimate concerns, but the reality is that today's students have a great deal of comfort with technology and

using it and other means to meet their individual needs, and the society we are preparing them for is moving increasingly toward differentiation and personalization.

Now is the time to engage directly in these debates and redesign public education policy so we are no longer constrained by old rules that were created during the agricultural and industrial eras, and instead create a system that optimizes the mix between public and personal good in the 21st century. We will need to identify the non-negotiable social constructs and values that we will not tolerate changing, and distinguish them from the ideas we hold onto out of nostalgia. Kayakers have an adage: in order to steer, you must paddle faster than the water you are in. Not embracing the future doesn't mean it won't happen to us anyway; it just means we won't be prepared to steer how it goes in order to take advantage of it for the most productive benefit of educators and the students and communities they serve.

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