The New American Imperative - a White Paper:

An Education System that Delivers What America (and the World) Needs

Introducing "America's Education Moonshot" - to lead the world in developing the smartest, hardest working and most patriotic students on the planet.

December 2023

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EXECUTIVE SUMMARY

All future wars will be won or lost based on designing, producing and controlling the technology that powers the world–the microchip. The new front on the battlefield is technology, and whoever has the brightest people producing the best computing power will win.

The US education system has failed to keep pace with other developed countries in preparing an educated, motivated hi-tech workforce. By every state, federal, business and international metric, our upcoming waves of new workers are not as prepared as most students in China. Reversing this trend is the new American imperative.

Technology is the most scalable, replicable and reliable disruptive innovation that can create a sense of ownership, hope and motivation for students to prepare to win the Chips War. By tightly coupling the only 100% USA owned and operated semiconductor company in the world with its domestic supply chain partners (America's Chips) with a complementary nation-wide education and workforce development strategy powered by Heroic Game Day starting in first grade (America's School), we can deliver what the families, communities, country and business community need to lead the world.

Though long term effectiveness and sustainability are matters of considerable debate, past federal education initiatives such as the National Defense Education Act (1958) that was passed to support America's Moonshot, and the Elementary Secondary Education Act (1965) demonstrate we can disrupt our education system to benefit our nation as a whole. By using existing education funds expended today on interventions and programs that do not demonstrate broad efficacy or measurable impact, America's School can quickly scale this across the country and immediately start growing the workforce of tomorrow, but it will take swift, courageous action of political, education, and business leaders. It will in effect, become America's next Moonshot - putting American students in a leadership position around the world.

By reauthorizing a National Defense Education Act II, the federal government will prioritize acquisition of digital skills, mathematics, computer science, information science, data science, statistics and all other workforce success skills as a matter of national security, and focus the general population on maintaining America's global leadership position.

BACKGROUND

The United States has not always been a superpower. This might come as a surprise to the vast majority of Americans who have only lived in an era where US policy, products and pride shape the world, but America's prominence on a global stage is less than 80 years old.

America's rise to the top culminated in the end of World War II as a result of complex geopolitical factors, but one unquestionable component was our education system, spurred by concerns for national security and economic prosperity, produced the brightest people who created things that were superior to the things anyone else created anywhere else in the world.

In 1905, George Santayana wrote, "Those who cannot remember the past are condemned to repeat it." World history is replete with examples of fallen of superpowers. Egypt. Greece. Italy (Rome). France. Germany. Great Britain. All superpowers in their own time but whose influence today is significantly lessened. Absent bold action, we soon may be witnessing the collapse of America's status as THE world's superpower.

How can that be? Our collective failure to imagine the US could ever NOT be is one explanation.

Generations unfamiliar with the past, generations who have only known the US as the greatest country in the world, seem overly confident, content and complacent in assuming we will always be so. But the signs of an imminent fall are evident. The canary in the coal mine is American education.

Just comparing our education system to the rising superpower, China, reveals red flags everywhere. At the highest level of education attainment as reported in Forbes Magazine in 2021, Chinese universities have surpassed U.S. institutions in the production of STEM PhDs, and based on current trends, it appears that gap will only grow wider in the years to come (Georgetown University's Center for Security and Emerging Technology, 2021). In fact, by 2025 it is expected that the number of Chinese STEM PhDs will be twice the number as US graduate students.

We see a similarly disturbing trend at the other end of the education system, elementary and middle schools. The most recently published results from the Program for International Student Assessment (PISA) shows scores of US students plummeting by 13 points in math down to its lowest score ever. While China did not participate in the 2022 PISA tests due to COVID restrictions, Chinese students from Beijing, Shanghai, Jiangsu, and Zhejiang posted the highest scores in the 2018. In the same year, US students ranked 13th, scoring 10% lower than Chinese students.

A rationalization often floated among US education leaders, teachers and policy makers is some version of, "PISA doesn't matter and our students know it. So they really don't try." While perhaps plausible, it is precisely the point. This is our failure to imagine that students not trying on a test that "doesn't matter" might be symptomatic of a more concerning problem–**lack of national pride**.

All of these factors taken together suggest one basic conclusion: American students, from elementary school to grad school, may no longer be the smartest, and there is no reason to believe future generations will reverse that trend if we simply continue to rely on an education system that is failing our kids, our communities, and our country.

In *Chip War: The Fight for the World's Most Critical Technology*, author Chris Miller reminds us that all future wars will be won or lost based on designing, producing and controlling the technology that powers the world–the microchip. The new front on the battlefield is technology, and whoever has the brightest people building the most and the best stuff will win.

The semiconductor industry is a great example. Sixty years ago, the US produced the brightest engineers who created this industry which propelled the USA as the leader of the free world. The brightest people creating the best things - in this case semiconductors. But the US has outsourced nearly all manufacturing of chips to Asia, and while chips are everywhere in our lives, they cannot be found in sufficient quantities in the US to sustain domestic manufacturing.

Semiconductors have become more valuable than oil itself. They will become even more relevant in a world managed by artificial intelligence (AI). The chip war is very real and will determine not only who ends up being the world superpower over the next 50 yrs but how well we live in America. The American dream and communist rule don't mix well. Both want to lead the world – only one will win out.

The US's global leadership position in technology is precarious. But rather than stabilizing it by ensuring our students are still the brightest in the world, we have resorted to economic hardball such as sanctions and tariffs. Our own experiences with prohibition in the 1920's should remind us that sticks alone don't work. "Those who cannot remember the past…"

On the other side of the Pacific, China has invested massively in an education system that prepares its citizens en masse to create better technology and use it to further the Chinese agenda across the globe. They will eventually get the tech or make it themselves. They will do it because of the massive wave of smart, hard-working and patriotic people coming up through the ranks. What will all those PhDs do? The Chinese government will decide.

So here's the real problem - very smart American chip executives are assuming the education system will continue to do what it's been doing for the past century - creating students and scientists that are the smartest, hardworking and most patriotic in the world.

This is where the massive fault line is - the US education system has completely failed to keep pace with other developed countries in preparing an educated, motivated hi-tech workforce. And while we can explain them away, K-12 results don't lie. And what we see is a culture of education that has lost its way in just a few short decades (see Appendix A).

We now seem more concerned about ensuring our kids feel like they've won, without putting in the actual work it takes to win. As legendary Green Bay Packers football coach Vince Lombardi extolled, "The will to win is not nearly so important as the will to prepare to win." On every state, federal and international metric, we are creating upcoming waves of new workers that aren't as prepared as the majority of students in China.

Reversing this trend is the new American imperative. We must not accept second place to China or any other nation.

REVERSE THE TREND

How can we quickly reverse decades of education malpractice?

The only way to reverse decades of education malpractice in a short period of time is to use technology that not only creates ownership, hope and motivation to work, but one that can exist on a complementary track to the existing education system until it becomes big enough to overtake the old and outdated system (see Clayton Christensen's book – Disrupting Class).

This is the same model as the computer PC. It was a market that was insignificant in the mainframe computer days. It grew and grew alongside that market until it eventually became so big that it overtook the mainframe industry. Now the rest is history. This is what is called disruptive innovation.

How do we do this today before it's too late?

America's Chips (www.americaschips.com) is a partnership that shows how this model can work. The only 100% USA owned and operated semiconductor company in the world, LA Semiconductor has brought its supply chain partners together to become the anchor subject matter expert in the education initiative, powered by Heroic Game Day. This is how business and real education combine to deliver what the families, communities, country and business community need to lead the world.

America's School (www.americasschool.org) is an universally accessible federally funded platform that delivers the learning and skills that the majority of a future American workforce will need to strengthen our national security and our ability to win the future wars.

America's School complements traditional education as a complementary "bolt-on" solution that delivers academic, social and healthy deliverables to schools while maintaining their autonomy. It is powered by Heroic Game Day (www.heroicgameday.com) which has been in the making for the past decade, basically using technology (game-based learning, data driven intelligence and blockchain) to connect, engage and deliver world leading academic, social and health results that will retain America's leadership position in the world.

This extremely scalable education system can educate one child with the same effectiveness as it can do with a million. We know if a student spends 30 minutes per day in the game, they will not only become proficient at the Top 20 critical life skills, but they will exceed expected growth targets and entire subgroups of students who struggle to reach achievement targets will demonstrate proficiency in their math and reading on state tests.

America's School can be implemented as a complementary track to the traditional education system and integrated where necessary and practical. It doesn't require classroom or teacher time and works on the standard device for education, the Chromebook.

America's Chips industry partnerships drive what the kids need to learn, the Industry leaders become the "mentors" to the students who are allowed to stand on the shoulders of the greatest generation of scientists

and innovators the world has ever known. This becomes a real integration of the real world and the kids digital world - a great warmup act for the world they are going to live in.

This is how you leverage your current success to ensure continued success.

Making these connections as early as 1st grade, will make a massive difference in how many students are ready and able to do the work that will lead the world as they enter college and the workplace.

All it will take is just 10% of a child's learning day (30 minutes) and a small fraction of per student funding to quickly turn this impending train wreck into the American dream for generations to come. We are able to leverage the great experience and traditions of winning that have been developed over the past 60 years and create the next phase of global American leadership.

HOW IS THIS FUNDED?

By using existing education funds that are being expended today on interventions and programs that do not demonstrate broad efficacy or measurable impact, we can quickly scale this across the country. Title 1 funds account for almost $20B per year, around 3% of the overall $600B budget.

If just 10% of that Title 1 budget is retained at the federal level before it is distributed to the states to be used to create a tsunami of successful students, starting with the 40% of the overall student population that is economically disadvantaged, and bringing in the other 60% at no additional cost, then 100% of US school-aged children can be upskilled for about $2 billion per year, or about .3% of the total education budget.

For a program that promises to engage all students, starting with the bottom 40%, and delivering the ownership, hope and motivation to put in the work to succeed, this is a drop in the funding bucket. Then add the fact that it requires only an additional 30 mins per day of high impact learning that significantly impacts all of the learning in that other 90% of learning time, this could very well become the greatest investment our government has ever made in the history of America. This is our moonshot moment that impacts everyone, in every current and future generation.

This is how to avoid a seemingly unavoidable American trainwreck. If America loses the chip war, then the American dream becomes little more than a failed experiment and an interesting chapter in the history books.

We need the bottom 40% of students to succeed. Anyone with the notion that we need to keep them in their place to maintain our position of advantage is greatly mistaken and they are the biggest threat to keeping the American dream alive. We need all of our children to succeed in this new competitive world of economies with vastly more people than the USA. If we don't help them succeed, this shortcoming will drag us and our way of life down.

We need to help ALL of our upcoming generation become the smartest, most hard-working and most patriotic generation in history.

America's School
Smart, Hard-Working & Patriotic

America's School is the platform that can make this happen.

HISTORICAL PRECEDENCE

Rallying the Nation in Times of Crisis: Historical Perspectives and Precedence

The United States Constitution is silent on education. Accordingly, as outlined in the US Bill of Rights 10th Amendment, “The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.”

Translation: Education is the responsibility of each individual state.

This means education is a matter of locality, its culture, traditions, priorities and principles, all critical to both preserving and advancing local interests. It also means that “education” varies widely from state to state, from governance to policy, sources of revenue, allocation and expenditure of resources, educator credentialing and quality, curriculum and assessment and a multitude of other school-related factors.

This model varies widely from other developed countries which have national systems of education. For example, there are over 13,000 independent school boards in the US. France, and nearly every other western European country, has one.

“Local control,” as it is commonly referred to, is a viable and vibrant political structure in peace time. In times of crisis, however, it is insufficient. In moments of peril when our national security is at risk, we need to rally our nation around a second, complementary system that is scalable, replicable, and reliable for every school-aged child in the US, regardless of zip code.

The US needs a delivery system, America’s School, that is complementary to, not simply in place of, state and local systems to ensure universal, rapid response to existential threats.

This notion is not without precedent. While the founding fathers left the matter of educating citizens to the states, it did not prohibit federal action through the legislative process. In 1958, at the start of what is often referred to as the “Space Race” between the US and the Soviet Union (USSR), the US Congress passed, and President Dwight Eisenhower signed, the National Defense Education Act (NDEA). NDEA allocated federal funds to the states for the specific purpose of promoting and improving math and science education for all students. Why? To ensure we would defeat the USSR and win the space race. We did.

In 1965, the US Congress passed, and President Lyndon Johnson signed the Elementary and Secondary Education Act (ESEA). As a critical tactic in Johnson’s “War on Poverty,” ESEA allocated federal funds to the states to establish as national priority that all children had "full educational opportunity.”

Unlike the NDEA which has largely dissolved over the past 50 years, ESEA survives today as the Every Student Succeeds Act (ESSA) and still channels federal funds to the states for education. Though its efficacy and legacy are matters of considerable debate, ESEA, along with NDEA, demonstrate that the federal government can, and will, disrupt our education system to benefit our nation as a whole. Now is the time for America’s School.

A CALL TO ACTION: REAUTHORIZATION OF THE NDEA (National Defense Education Act)

Investments in Science, Technology, Engineering, and Mathematics (STEM) education are a necessary part of increasing homegrown American computing power, geopolitical leverage, and vastly improved national security.

The digital age demands a digital corps, and the time is now for the United States to invest significantly in National Defense Education Act II as a complementary force to local control in order to spur growth of hi-tech workforce development domestically.

As a matter of constitutional structure, American students do not have equal access to tools, resources, nor quality of education that all need to succeed, especially in STEM-related fields like technology and advanced manufacturing. This is only exacerbating the human talent deficit and represents the single greatest challenge to designing and manufacturing chips domestically for national security purposes and leading the world..

As noted in a May 2021 article in "The Hill" many groups such as women, minorities, and those from low-income status remain underrepresented in the STEM fields and leave STEM fields at higher rates. Minorities comprise only 33 percent of STEM jobs in America, four percent lower than their overall representation in the overall U.S. workforce.

China will always produce **more** workers than the US. It is a country with four to five times more people than the US. That means to win the Chip War the US must train five times more of its tech talent with the same seriousness of purpose that we grow military officers. Where do we get that many more tech workers in the pipeline? From the underrepresented populations.

To build a bigger, better, brighter workforce than China capable of designing and manufacturing the world's most valuable resource, semiconductor chips, requires bold action.

By passing a National Defense Education Act II, the federal government, through not only funding but meaningful mandates for a scalable, replicable, reliable on-demand "America's School" system, can prioritize acquisition of digital skills, mathematics, computer science, information science, data science, statistics and all other workforce success skills.

NDEA II must include not only secondary and post-secondary efforts, but shall include right-skilling and preparing students **when they enter elementary school**. America's School will dramatically swell the numbers of under-represented and disadvantaged students in the pipeline who will pursue university-level STEM programs pursuing and succeeding in undergraduate, graduate, and PhD-level programs. Ultimately, the goal of NDEA II is to widen the digital talent pool by incentivizing programs for underrepresented Americans that will rise the tide for all Americans.

AMERICA'S SCHOOL IN ACTION

Highlighting two elementary schools in the heart of southern Ohio's Appalachia region, Ironton Elementary School and Chesapeake Elementary School, we can clearly see America's School in practice.

The Ironton City School Board of Education levies taxes, makes policies and employs teachers to serve the needs of the Ironton community. One hundred percent of Ironton Elementary's students qualify for free and/or reduced lunch. Thus, the school district qualifies for significant Title I funds from the federal government for supplemental services.

The Chesapeake Union Exempted Village School Board of Education exercises its full autonomy, or local control, to decide how it deploys its system of education, within the bounds of Ohio law. Only about half of its students are economically disadvantaged, meaning that while the district receives some Title I funding, it is significantly lower than that of Ironton Elementary.

While the programs and services provided to students in these two elementary schools in the same county separated by only about 20 miles are similar, they are not the same. From classroom resources to class size to the length of the school day to how they recruit, train and compensate their teachers all differ. Which means the learning experiences for their students differ as well.

However, both elementary schools have adopted the same complementary learning platform, Heroic Game Day, that delivers precisely the same learning experience and the same learning outcomes in just 30 minutes a day regardless of which school district their families live.

This solution is:

1. Scalable - Able to grow quickly and increase capacity and performance to meet mass demand of students
2. Replicable - Delivers the same learning experience to every student regardless of where they live
3. Reliable - Provides the same quality of learning regardless of the teacher
4. On-Demand - Is accessible when parents and/or students want the service, not just when school is in open and in session

The children of Ironton still belong to Ironton Elementary School. The children of Chesapeake belong to Chesapeake Elementary School. But children of both schools are simultaneously enrolled in America's School, a bold, educational program by the United States government

The Ironton Elementary Phenomenon:

Results

Heroic Game Day Participation

- Led all Heroic Game Day schools in most minutes in the game (202,239)
- 95% student participation rate
- 2022-23 Ohio Heroic Skills Competition State Champion

Composite Index/Performance Index

- Earned the highest "Composite Index" of all Heroic Game Day schools on the 2022-23 report card with +9.35.
- Ranks the highest among Ironton's 20 "similar" districts
- Placed in the 99th percentile of all 1,618 elementary schools in Ohio that report a Composite Index.
- Earned a Performance Index for 2022-23 of 94.1, trending up from 87.7 in 2021-22 and 84.7 in 2020-21

Heroic Game Day | The Ironton Effect (youtube.com)

that is, starting in first grade, building the skills required of all of the students in both communities to win the Chip War.

The same is happening in Canal Winchester Local 150 miles to the north as well as Berkshire Local more than 300 miles. All students getting a scalable, replicable, reliable learning experience anytime, anywhere. All enrolled in America's School and all working toward America's goal–Win the Chip War.

THE BRAND AND PR

The brand that every school will be giving as they adopt the program is the “Smartest, Hardest Working and Most Patriotic in the World” seal of being a part of helping America win:

The PR channels:

- trade publications
- general interest publications
- federal and state government contacts
- industry partners
- school marketing
- press events
- social media
- high profile people
- grandparents and parents

The Campaigns:

- Every child enrolled in America’s School (no cost - no classroom time - no teacher time - no excuses) We will fund the program at the federal level (Title 1 funds) as this is a matter of national security.
- Which states are fighting for America (show their K-6 proficiency scores and if they are on the ‘working on it’ or “not working on it” list)
- The state leaderboard showing who’s winning the Fight for America

Each state will have their own state leaderboard of students and schools and there will also be a national leaderboard that shows which students, schools and states are leading the country. The leaders will receive prizes and awards for their efforts. School that win state and national challenges will receive banners for their school as well as positive press.

APPENDIX A

This is what was presented by Heroic Game Day (formerly Woogi Inc) to the education establishment 12 years ago…

Education in the US is Broken

eSchoolNews

Wednesday, February 25, 2009

'... Something needs to be done now'
Poor showing on international exam prompts calls for better science instruction

National standards, a high regard for teachers and the teaching profession, more equitable distribution of resources, autonomy at the school level to implement reforms, and opportunities to personalize instruction: These are some of the key reasons Finland saw its students earn the highest marks in both science and math on a recent international exam.

U.S. students, in contrast, were outperformed on average by 16 other industrialized countries in science—and by 23 in math.

The poor showing of U.S. students on the latest Program for International Student Assessment (PISA) has renewed calls to improve math and science instruction to keep the nation competitive in the new global economy.

And in light of the results, many observers say the U.S. has much to learn from other countries.

The test was given to 15-year-olds in 30 industrialized countries last year. It focused on science but also included a math portion. The 30 countries, including the United States, make up the Organization for Economic Cooperation and Development (OECD), which runs the international test.

The issue is not that U.S. students did so poorly on the exam; it's that other countries have made significant strides in the last few years.

There was no change in U.S. math scores since 2003, the last time the test was given. Yet students in other nations—such as Poland and Estonia—improved enough to leapfrog U.S. students in the results.

Finland's 15-year-olds did the best on the science test, followed by students in Hong Kong and Canada. Students in Finland, Taiwan, South Korea, and Hong Kong were the top performers in math.

The results serve as a harsh wake-up call to U.S. educators and policy makers, many observers said—especially as the economy becomes more global, and the need to compete with businesses and employees from other nations intensifies.

At a Dec. 4 briefing to discuss the PISA results, representatives from six national organizations—theAlliance for Excellent Education, Asia Society, Business Roundtable, Council of Chief State School Officers, ED in '08, and National Governors Association—called for more emphasis on the teaching of 21st-century skills in U.S. schools.

"Our students' performance today is the best indicator of America's global competitiveness tomorrow," said Raymond Scheppach, executive director of the National Governors Association. "The United States faces emerging challenges across the international marketplace. The countries that thrive in this new global, entrepreneurial, and knowledge-based economy will be those that have the most highly skilled and educated workforce."

Business Roundtable President John J. Castellani questioned the lack of outrage that accompanied the test results.

"It is difficult to understand why mediocre achievement by U.S. teenagers on international math and science assessments produces less concern and outcry than mediocre performance by a football or basketball team," Castellani said.

He added: "There is worldwide competition for people with strong backgrounds in math and science who have the analytic and problem-solving skills needed to create tomorrow's innovations. We need to take a serious look at what the U.S. can learn from the education systems that routinely pass us by."

A Disruptive Innovation is needed in our education system

It will only happen from the bottom up (kid generated)

Kids need to be taught using the tools that engage them and then motivated to teach others

eSchoolNews

Monday, February 23, 2009

AASA hears what's about to disrupt schools

Online instruction, says best-selling education author, will change schooling as we know it--if we're lucky
By Dennis Pierce, Managing Editor

If Harvard Business School's Clayton Christensen is right, half of all instruction will take place online within the next 10 years--and schools had better get into the online-learning market or risk losing their students to other providers.

Christensen was at the American Association of School Administrators conference in San Francisco Feb. 19 to discuss his book *Disrupting Class*, which looks at why schools have struggled to improve through the lens of "disruptive innovation."

Disruptive innovation is the business idea that, every so often, a new innovation comes along that completely changes the marketplace, knocking the old market leaders from their perch and giving rise to new ones.

Disruptive innovations transform products or services into something so simple that anyone can use them, creating what Christensen called "asymmetric competition."

Because they take advantage of these radical innovations, new entrants to the marketplace are essentially competing against "non-consumption"--that is, they're getting customers who didn't exist in that market before--while the innovation continues to improve.

Once the new innovation has matured, these companies are in a great position to compete with the established market leaders, Christensen said--and therefore they nearly always win.

To illustrate this idea, Christensen brought up the example of the personal computer in the 1980s. At the time, mainframe computer manufacturers such as IBM, Wang, and Digital Equipment Corp.--which made a smaller mainframe called the "mini-computer"--were the clear market leaders.

When Digital was thriving, people attributed its success to sound management practices--and when the company suddenly collapsed in the 1990s and was bought by Compaq Computer Corp., one of the new market leaders along with Dell, some of these same people attributed its collapse to poor management, Christensen said.

"How can smart people suddenly get so stupid?" he asked. His answer: It wasn't management's fault; it was disruptive innovation. "It's actually the principles of good business management that assure each company's ultimate demise," he said.

The early PCs weren't very good, Christensen explained, which is typical of the first wave of products to take advantage of any innovation. And as all good companies do, Digital listened to its customers, who were saying this very thing. As a result, Digital decided it wasn't worth changing its business model.

In effect, the company's managers had to choose between making good products with a high profit margin, using a well-established business model; or scrapping that model--an extremely risky move--and making flawed products with a much smaller profit margin. Of course, sound business management practices said they should choose the first option...and the rest, as they say, is history.

A few companies have broken this model and continued to thrive after a disruptive innovation has occurred, but they've done so only by setting up a completely independent business unit, Christensen said--in effect, giving it a charter to compete against (and kill off) the parent company.

As the only mainframe company to survive into the PC era, IBM made the transition by creating a separate business unit for making and selling PCs, he explained.

Taking this idea one step further, Christensen noted: "A corporation can evolve, but the individual business units within it cannot." That raises an important question for those who seek to reform education: According to this theory, a school system, too, can evolve--but can the individual schools within it?

Expensive failure always results when disruptive innovation is framed in technical rather than business-model terms, Christensen said.

For example, take the transistor, which ultimately replaced the vacuum tube in radios and TV sets.

In trying to make early transistors good enough to work with these older models, Christensen said, the market leaders in vacuum-tube radios (such as RCA) spent the modern equivalent of billions of dollars in research and development. In the meantime, Sony came along and transformed the marketplace with its invention of the pocket radio.

Instead of spending so much money trying to make the new technology work within their existing business model, RCA and others would have been better off spending that money to reinvent their business.

Christensen drew a parallel with today's schools: Public schools have spent an estimated $60 billion putting technology into classrooms, he said--but they've largely been doing the same thing RCA was doing:

applying a new technology on top of an old business model. And that's a key reason today's schools have struggled to improve.

Whenever a disruptive innovation occurs, the substitution pattern in which the new model replaces the old one follows an S-curve pattern that can be calculated mathematically, Christensen said. At first, as the suppliers of a new innovation work out its flaws, adoption is fairly flat. But then, as the innovation improves to the point where it's widely affordable, accessible, and delivers a satisfactory experience, adoption spikes exponentially.

This mathematical model has proven to be remarkably consistent throughout history, Christensen said. And if that historical pattern holds true, then the latest disruptive innovation that is sure to affect education--online learning--is set to take off dramatically.

Online enrollments have grown from an estimated 45,000 in 2000 to more than a million last year. By 2013, he said, 10 percent of all "seat time" will be occupied by online instruction--and within 10 years, he predicted, more than half of all seat time will be online enrollments.

"This is a very dramatic change that will happen in 10 years," he said.

Until now, the providers of online instruction have catered primarily to areas of "non-consumption" in education, Christensen said, such as credit recovery, AP courses, and home-schooled or homebound students.

But that will change once online instruction reaches its tipping point--and if schools want to compete for these "customers" (their students), they should consider partnering with an online-learning provider or starting an online program of their own.

Another reason schools have struggled is the conflict between how they've traditionally had to teach and how students learn most effectively, Christensen said.

Until now, it has been very expensive to teach to students' individual needs, he said--and yet, research shows that's how students learn best.

One reason online learning is attractive is because it allows for more of this customized approach to instruction than can be found in many classrooms. But now, software that enables every child to learn at his or her own pace is becoming a scalable, modular way to deliver customized learning, Christensen said--and it's another economically important solution for schools.

He concluded with a warning to the senior school district executives who'd come to hear him speak: "Charging education isn't changing education."

"My fear is that all this federal funding [from the stimulus package] will give us the complacency to continue as we've been doing things," he said. "I hope we have the discipline to use this money to **really address** the reasons why kids aren't learning."