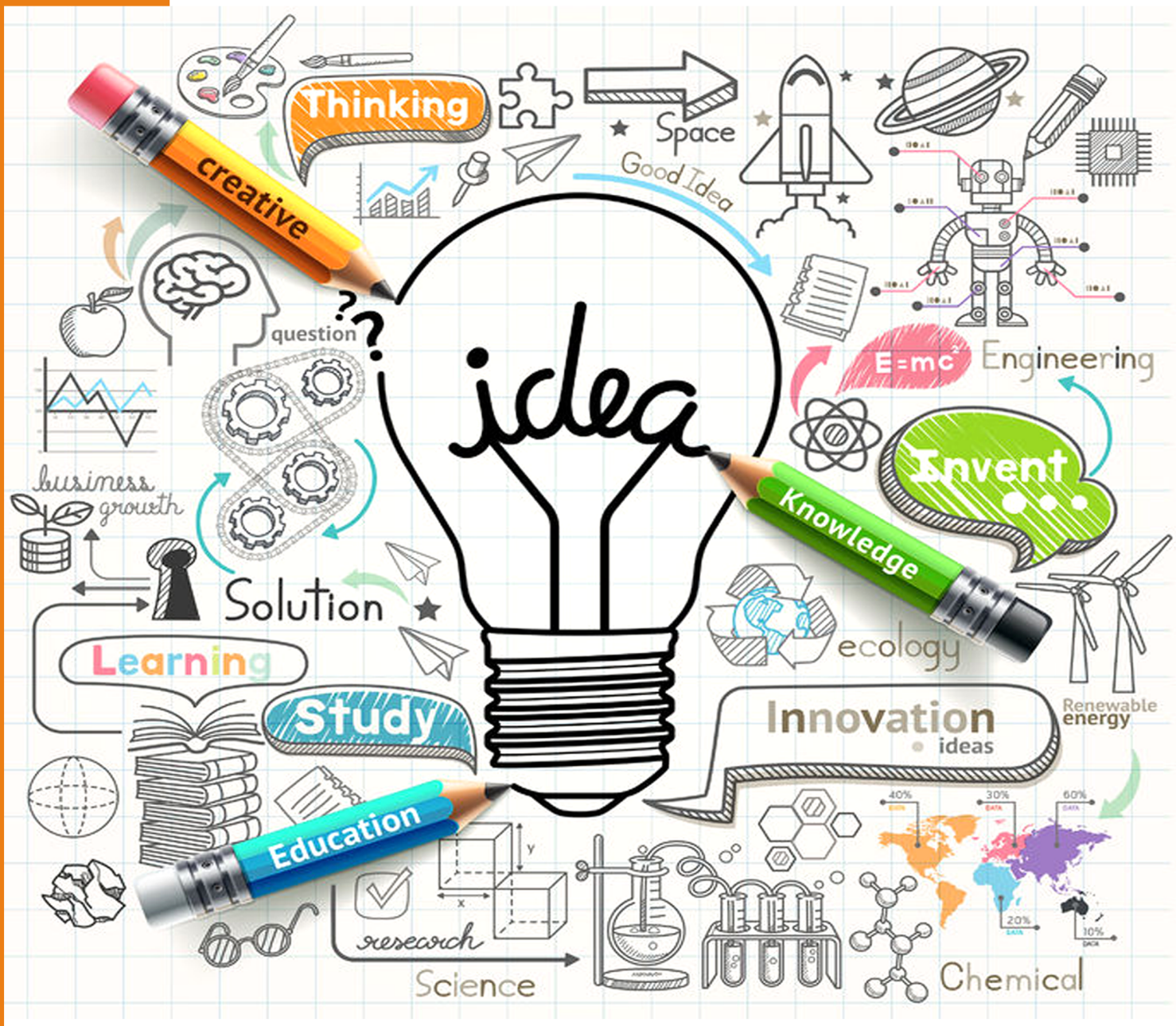

Innovation and Deeper Learning

VOLUME 2

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Prelude

[S]tudents deserve the best possible education that we can provide. As 'the richest nation on earth,' it is morally indefensible to give them anything less.

– Vartan Gregorian, President, Carnegie Corporation of New York[1]

In his recent novel Origins, controversial author Dan Brown postulates a future in which the next state of evolution for humankind is to merge with Artificial Intelligence (AI). Fantasy? At least, fiction to be sure.

The future, today. Hands-free driving and vehicle-to-vehicle communication are the latest forward-thinking technologies finding their way into new Cadillacs. Innovation isn't just what we do; it's coded in our DNA. From inventing the electric starter to re-inventing how we drive, we will continue our 115-year journey to drive the world forward. And there's no end in sight. - Cadillac[2]

The future is happening, and it is happening far faster than most of us realize. The problem with technology is that many of us still view it, such as Amazon's new "Alexa" system, as novelty or entertainment. While it's great to have the latest innovations, or the "coolest smart phone" once a critical mass is reached, real jobs will be lost and the gap between education "haves" and "have-nots" will increase exponentially. What does this mean for American education, and more specifically, the American high school? For one thing, it probably means that all past efforts to "restructure" the high school have been temporary, or single application, "fixes". Granted, successes like early college high schools (ECHSs) seem to mitigate this, but we have been doing has been to "temporarily" alter structure, policy or procedures to support innovations that seldom grow. Even these "fixes" seldom hold long even where originated. For example, the Columbus City Schools recently asked the Ohio State Board of Education for a waiver allowing for "selective" admission to its previously open enrollment Afro-Centric Early College High School, one of the original eight ECHSs in Ohio.[3]

One of the breakthrough elements (and true redesign features) of early college high schools (ECHS) was to accept any student, regardless of past academic performance. This was a major consideration for the Bill and Melinda Gates Foundation, who helped fund the start-up of Ohio's original ECHSs, but there was widespread disbelief at many ECHSs across the country that impoverished children, many already years behind in reading, from populations already underrepresented in higher education, could master the material. Representatives from the Canton City Schools and Stark State College continually advocated at the state-level to keep this open enrollment element in place because of the powerful message it sent to students, their families, and the community. The element remained in place. However, the state board approved the Columbus request in January.[4] The American high school, it seems, is a system that will always try to achieve a degree of "homeostasis" despite what innovations we incorporate or

because of changes in the external environment. In the case of Columbus, and we do mot attribute belief or motive, its ECHS may now become yet another "magnet" school, i.e. special condition high schools, drawing selective students for selective programs. Indeed, it is the one area where "change" is accepted, but seldom "systemic" change. Magnet schools don't initially threaten the homeostasis of the organism. They seldom bring about systemic change. Ironically, they will eventually be compelled to regress to the norm as they are eventually seen as threats, particularly if highly successful. Change at the high school level remains conservative at best.

In 2016, the U.S. Department of Education published a document entitled *Using Evidence to Create Next Generation High Schools*[5]. While acknowledging that other strategies could include personalized learning or access to high quality digital tools and technology, the reviewed strategies "for enhancing students' high school and college outcomes include: 1) participation in rigorous curriculum; 2) small learning communities/small schools of choice; 3) career academies; 4) dual enrollment; 5) early college high schools; and 6) college and career counseling."[6] These strategies present nothing new to Stark County educators who have successfully used many for years. Some initiatives, such as the Ohio High School Initiative (OHSTI) have come and gone, once funding ended.

How then does a community create and sustain a truly innovative "next generation" high school that not only remains innovative, but also relevant? According to the Carnegie Corporation, this means seizing the opportunity to redesign schools to promote personalized learning. Yet, we have come up short.

So far, much work has gone into retooling many of these (reform) elements individually. Many states, districts, and schools have made essential progress in changing teacher preparation and professional development to help talented educators enter and stay in the classroom. There have also been pushes for interventions like additional learning time, new curricula, and new technology, much of which has been shown to have a significant impact on student achievement. However, applied individually, each of these fails to get our schools and school systems where they need to be to serve every student.[7]

This white paper will explore these issues through the perspectives of several members of the Atlantic Rim Collaboratory, who are attempting to share ideas and concepts on system redesign, by examples of schools that are making deep learning a priority through technology and by examples of initiatives and schools that have made personalized learning and mastery the focus of what they do. All these approaches are important for they become part of a comprehensive whole that can drive meaningful change. The key word here remains "meaningful". Educators are very familiar with the "flavor of the month" type of change and initiatives that come and go because systems never change to adopt them long-term. The philanthropic community, for one, has been very helpful in bringing many of these changes about. Yet, philanthropy is not geared to sustain such changes long-term. Even the Carnegie Corporation of New York (CCNY) whose massive Opportunity by Design (ObD) Program that will cite later, looks to have system funding adapt to support changes beyond its initial funding period.

Yet, the greatest single change in education over the last decade has been the widespread use of core standards and standardized tests for accountability, rather than instructional improvement. Mustering political and stakeholder will for meaningful educational change and, in this case, high school redesign, is, and will remain, a priority. Perhaps as Linda Darling- Hammond says, "Maybe we need a teacher to run for President."[8]

http://atrico.org/

The Atlantic Rim Collaboratory

All nations, have education systems. In many cases, these are further sub-divided into state, regional, or provincial systems and although these have been international education programs and initiatives in the past, such as through the Organization for Economic Cooperation and Development (OECD) and the United Nations, these have not brought together systems and education leaders to engage in "open dialogue, shared problem-solving, and engagement with world-class thought leadership".[9]

This was the vision of Dr. Andy Hargreaves, the Brennan Chair in the Lynch School of Education at Boston College, when he and Yngve Lindvig of LearnLab/Conexus founded the Atlantic Rim Collaboratory (ARC) in 2015. Founding organizations included the Education Ministries of Scotland, Iceland, Ireland, Finland, Aruba, Sweden, Wales and the Canadian province of Ontario. Also involved were the Office of the Secretary of Education in Vermont, and the California Board of Education.

Uniquely, Hargreaves also involved several recognized education thought leaders, such as Sir Ken Robinson, Pasi Sahlberg, Jeannie Oakes, and others in the process.

ARC held its first summit in Iceland in 2016.

There is a compelling need to create more success and opportunity for all young people

across the world. We now know that students achieve more when their teachers learn from each other and work together effectively. Schools improve when they learn from other schools and collaborate with them to take shared responsibility for all students' success. Countries, states, and provinces are no different. Isolation limits improvement. Circulating good ideas, learning from both mistakes and successes, and working together to turn them into practice, means that many young people benefit in many places. Systems need to learn and work together, just like teachers and schools.

While noting that states and systems have already had ways to collaborate, ARC leaders nonetheless felt:

But there are some areas of education on which all countries and other large systems do not always agree, or that they don't all regard as a priority. These areas, such as special education inclusion, democracy and human rights, also need to be part of the global conversation about educational improvement and transformation. For this to happen, nations and other systems with similar values and priorities can sometimes come together in smaller, more focused groups to share practice and make progress in all aspects of learning and teaching that they believe truly matter. This is the driving purpose of and reason for the Atlantic Rim Collaboratory.[10]

The balance of this section will focus on some of the founding members and thought leaders, with a particular emphasis on what they are doing to promote innovative and deep-learning high schools.

In general, policy-makers in the United States pay very little attention to educational developments in other countries, other than to cringe when international rankings, such as PISA[11] or the Trends in International Math and Science (TIMSS) Study are published. The philosophy here in the United States has been that we need better standards or more accountability, or that teachers, administrators, families, or the students themselves are at fault. There has been a "background" belief that we have (and arguably still do) the greatest system of public education in the world. All we need to do, is to standardize it, test it, or tweak it. All this overlooks the fact that other nations (our competitors in the global economy) are looking at changes, and in many cases, systemic changes to their P-12 systems, particularly their secondary schools. In a new era where human capital is the vital ingredient, they are looking to match, or surpass, the United States.

Perhaps is this nowhere better seen than in a new commission, The International Commission on Financing Global Education Opportunity, (http://report.educationcommission.org/) convened by the Prime Minister of Norway, the Presidents of Malawi, Indonesia, and Chile, and the Director-General of UNESCO, following the 2015 Oslo Summit on Education for Development. The commission was formed to face a growing global crisis. By 2030 one-half of the world's 1.6 billion children will not be in school or will be failing to learn. Further, the commission projects that:

Today's generation of young people faces a radically changing world. Up to half of the world's jobs – around 2 billion – are at high risk of disappearing due to automation in the coming decades. In contrast to the impact of innovation in previous generations, new technologies risk not creating new jobs at anything like the scale they are eradicating them. Due to shifts between industries and the changing nature of work within industries, demand for high-level skills will grow, and many low- and medium-skilled jobs will become obsolete. Jobs open to those without high-level skills will often be insecure and poorly paid. Only quality education for all children can generate the needed skills, prevent worsening inequality and provide a prosperous future for all.[12]

The commission's report, *The Learning Generation: Investing in Education for a Changing World*[13] should be required reading for all education policy makers. This commission, with an impressive array of partners and the involvement of many current and former heads of state, calls education for all children the civil rights issue of the 21st century. At the 2016 United Nations General Assembly, then Secretary-General Ban Ki-moon received the report and agreed to act on its recommendations, as has his successor António Guterres. As the commission notes:

A 21st century education should not just confer a credential; it must expand the capabilities of all. Therefore, innovations in teaching and learning must move to the center of the education agenda. As factories are automated, hospitals digitized, and homes hardwired, what message do we send when classrooms today mirror those from centuries ago? We need to invest in the education workforce and reimagine what it could become. We need to place the teacher at the center. This means thinking of the skills of the teacher in a new and most positive light — the guide by your side as well as the sage on the stage — and investing in the entire education workforce. And we need to get all classrooms online with a scalable digital infrastructure. Under our plan, all classrooms — from the remotest village and the most desolate refugee camp to the most crowded city — will be online with a scalable digital infrastructure.[14]

The commissions first progress report is also now available on its website.[15] The commission is separate from ARC yet aligned with many of its principles. What are some of the members of ARC doing on a practical basis?

Iceland

https://www.government.is/topics/education/

The Ministry of Education, Science and Culture is responsible for the implementation of legislation pertaining to all school levels from pre-primary and compulsory education through the upper secondary and higher education levels, as well as continuing and adult education. -Ministry of Education

In Iceland education is compulsory between the ages of six and sixteen with what is know as primary and lower secondary education (up to age 16) being in one system and generally taking place in the same school. Yet ISCED 3, or what we would consider (upper secondary school to age 20) a high school equivalent, has a specific structure that actively incorporates students into the decision-making process:

- *School curricula are issued in all secondary schools. The curricula describe available study programmes, the length and content of courses, division according to subject matter, teaching methods, learning assessments and administrative methods. The school board of the school in question must approve the curriculum for it to take effect, and the board monitors its implementation.*
- *The Minister of Education appoints a five-member school board to prepare annual work plans and the budget for the school. Teachers and students shall act as observers and have the right to speak and submit suggestions.*
- *The school head, appointed by the Minister of Education, governs the school and is responsible for day-to-day operations and work.*
- *The school head recruits the assistant head and all other staff members, in consultation with the school board.*
- *The school board shall provide the head teacher with advice and assistance with the management of the school. The board consists of management and the representatives of teachers and students.*
- *Student committees in secondary schools have, among other things, the right to make suggestions and comment on the goals of study programmes, educational material, and teaching arrangements. Student associations, which are the general associations of students in each school, establish rules on the appointment, responsibilities and procedures of student committees.*[16]

Upper secondary school in Iceland has specific purposes as outlined in the Upper Secondary Education Act of 2008. These deserve a review as they represent the core philosophy of education at this level:

Upper secondary schools shall prepare students for participation in working life and further studies. They shall strive to develop their students' proficiency in the Icelandic language, both spoken and written, reinforce their moral values, sense of responsibility, broadmindedness, initiative, self-confidence and tolerance, train them to apply disciplined, independent working methods and critical thinking, teach them to appreciate culture and encourage them to seek further knowledge. Upper secondary schools shall communicate knowledge and train students in a way that provides them with the skills required for specialised occupations and the prerequisites to pursue further education.[17]

Ireland

https://www.education.ie/en/The-Education-System/Post-Primary/

Like Iceland, Ireland has both a lower and upper (junior and senior) secondary school cycle. The Senior Cycle serves students from 15 to 18 years of age. Significantly, It includes an optional Transition Year, which follows immediately after the Junior Cycle. This Transitional Year provides an opportunity for students to experience a wide range of educational inputs, including work experience, during a year that is free from any formal examinations.

During the final two years of Senior Cycle students take one of three programs, each leading to a State Examination and the award of certificates. These are either a traditional Leaving Certificate, the Leaving Certificate Vocational Program (LCVP) or the Leaving Certificate Applied (LCA). These certificates are different in curricular design with the LCA being "a person-centered course involving a cross-curricular approach rather than a subject based structure." Beyond the senior cycle is the option for further education and training (essentially continuing education offered by a variety of providers) and the third, or university, level. The National Council for Curriculum and Assessment (NCCA) is a 25-member statutory body of the Department of Education and Skills that advises the Minister of Education on curriculum and assessment.

Ireland, as are many other countries, is working to achieve a balance between content knowledge and deep learning at the high school level. Perhaps nowhere is this better seen than in the new computer science curriculum specification for the senior level:

Senior cycle is founded on a commitment to educational achievement of the highest standard for all students, commensurate with their individual abilities. To support students as they shape their own future, there is an emphasis on the development of knowledge and deep understanding; on students taking responsibility for their own learning; on the acquisition of key skills; and on the processes of learning. The broad curriculum, with some opportunities for specialisation, supports continuity from junior cycle and sets out to meet the needs of students, some of whom have special educational needs, but all of whom share a wide range of learning interests, aptitudes and talents. Curriculum components at senior cycle promote a balance between knowledge and skills, and the kinds of learning strategies relevant to participation in, and contribution to, a changing world where the future is uncertain.[18]

Sweden

https://www.skolverket.se/om-skolverket/andra-sprak/in-english/the-swedish-education-system

Since the beginning of the current century, international studies Sweden has participated in have shown that the knowledge students leave school with is not as good as before. Many students drop out of their upper secondary studies. And Sweden has a high level of youth unemployment compared to other countries.

These trends led to the reform of the upper secondary school and the compulsory school in 2011. – Skolverket (2011) Upper Secondary School 2011[19]

The Swedish system of education might seem strange to most Americans. Preschool is the responsibility of municipalities, yet fairly universal from age 1 on. Compulsory schooling begins at age 7 and can last 9 to 10 years (longer for students with disabilities). Upper Secondary School is voluntary and highly diversified, consisting of 18 different national programs lasting up to three years. Programs can be either vocational, preparation for college, or serve as an apprenticeship.

Concern among Swedish leaders that the quality of education and the view of general competencies that students needed, led to the reform of upper secondary education in 2011. That reform was as follows:

- *Students should be well prepared. Each student through upper secondary education should be well prepared for working life immediately after upper secondary school or for further studies at higher education level. The degree of specialization must increase without any reduction in the requirement for general competences. Vocational education should provide good preparation for working life so that students can start working immediately after upper secondary school. Students should on completing their studies be virtually ready for a specific profession. Time allocated to subjects typical of a programme should be extended. The higher education preparatory programmes should effectively equip students for studies in higher education. Part of this preparation involves the high demands imposed on basic eligibility for higher education. Coordination between school and working life must be strengthened to ensure high quality of education and strong involvement from industry and the public sphere.*
- *Everyone should reach the goals. The throughput should be high and students should complete their upper secondary diploma within three years. As few students as possible should drop out of their upper secondary education. Entry requirements to the upper secondary school should be high so that students are better prepared for upper secondary level studies. For students that do not fulfil the entry requirements, there are five introductory programmes.*
- *Education should be equivalent. During the beginning of the 2000s the upper secondary school became more varied and difficult to get a clear view of. The number of specially designed programmes increased substantially as did the supply of local orientations and local courses. The wide range of educational programmes made it difficult for students, parents and stakeholders to have an overview and understand what the different education paths could lead to. It was also difficult to assess what students were capable of after completing their education. For students to feel confident that there would be a demand for the knowledge they had acquired from their education, upper secondary education including vocational programmes should be quality assured nation-wide by the National Agency for Education with the help of the national programme councils.*
- *Study paths and steering documents should be clear. Students, parents, stakeholders should know what an upper secondary education contains and what they can expect to achieve during the education. The steering documents should provide clear support to teachers in their teaching.*[20]

These points are included in an extensive 258-page document discussing the state, needs, causes and means for reform of upper secondary education. Interestingly, no curriculum is published as the Swedes, recognizing that curriculum should be fluid and adaptable do that through a separate web site.[21]

Wales

http://21stcenturyschools.org/?lang=en

Our national mission is ambitious, innovative and confident as we work to deliver a reformed and successful education system. By learning together, we can develop a better Wales. - Kirsty Williams AM Cabinet Secretary for Education

Wales and its 1500 schools are in the midst of a national initiative seeking proposals to fund 21st Century Schools. A new action plan (2017-21) entitled Education in Wales: Our National Mission[22] points out that:

21st Century Schools is more than a building programme. It is a long term strategic investment in our educational estate throughout Wales. It is a unique collaboration between Welsh Government, the Welsh Local Government Association (WLGA), local authorities, colleges and dioceses. The delivery of the first investment phase (Band A) will continue until March 2019. A second wave of investment, Band B, is under development and will commence in April 2019.

Reform in Wales is, in actuality, P-16 reform[23]. In many ways, it represents a conventional approach, very much tied to standards and assessment. However, it remains based on what the government of Wales considers four enabling principles:

- Developing a high-quality education profession.
- Inspirational leaders working collaboratively to raise standards.
- Strong and inclusive schools committed to excellence, equity and well-being.
- Robust assessment, evaluation and accountability arrangements supporting a self-improving system.

Reform here might also be termed nationalistic reform. It is easy for Americans to think of Great Britain as England when it also means Scotland and Wales which have autonomy in terms of internal governance. National identity is important to the Welsh. As a consequence, one goal is for everyone to become fluent in Welsh. Wales, though part of There is one other driving factor. In 2015, the government of Wales passed what is called the "Well-Being of Future Generations (Wales) Act". Consequently, reform is in concert with the following well-being principles:

- *Support people and businesses to drive prosperity.*
- *Tackle regional inequality and promote fair work.*
- *Drive sustainable growth and combat climate change.*
- *Deliver quality health and care services fit for the future.*
- *Promote good health and well-being for everyone.*
- *Build healthier communities and better environments.*
- *Support young people to make the most of their potential.*
- *Build ambition and encourage learning for life.*
- *Equip everyone with the right skills for a changing world.*
- *Build resilient communities, culture, and language.*
- *Deliver modern and connected infrastructure.*
- *Promote and protect Wales' place in the world.*[24]

The final point underscores the drive for reform in the Welsh education system. Wales, in addition to being part of ARC, collaborates widely with OECD and outside experts. There is a drive to have its education system highly respected nationally.

Three ARC Thought Leaders

We are at a pivotal moment in world history. An immense crisis has come upon us and our lives are being turned upside down. We are in the midst of the greatest economic turmoil in half a century. - Andy Hargreaves and Dennis Shirley[25]

Dr. Andy Hargreaves

Dr. Andy Hargreaves, who along with and Yngve Lindvig, founded ARC in 2015 is very well aware of how other nations are striving to create high performing education, would contend that the U.S. is stuck in the "dog days" of public education and large-scale reform; reforms that put teachers under assault and seek to split up and minimize public education. Ironically, the world's highest performing systems, he notes, are strong public systems.

The U.S., however, is stuck in what Hargreaves and Shirley term the second way of reform. That way, which originated in the 1980s, according to Hargreaves:

...remains pervasive in the U.S. today, enforced consistency through more testing, standardization and accountability, and introduced competition through school choice. Unfortunately, a one-size-fits-all system of prescribed curriculum programs and teaching-to-the-test led to professional disillusionment and made it difficult to attract and retain excellent teachers.[26]

Drawing heavily on their international research, the authors describe a fourth way of reform, a new model in which in which schools exist for the common good, to serve all children and:

To become more successful innovators, we need to establish platforms for teachers to initiate their own changes and make their own judgments on the frontline, to invest more in the change capacities of local districts and communities, and to pursue prudent rather than profligate approaches to testing. The Fourth Way is about reforming rather than destroying teacher associations, and it integrates technology with high quality teaching instead of replacing teachers with iPads and online learning at every opportunity.[27]

While not specifically addressing the fourth way, its essence pervades the ARC whose declaration firmly implies that systems with common values, most specifically inclusion, democracy and human rights, can come together in smaller groups to share their experiences and learn from one another.[28]

Pasi Sahlberg

Pasi Sahlberg, director general of the Centre for International Mobility in Helsinki, Finland, is another ARC thought leader. His thinking parallels Hargreaves' on the pervasiveness of the "Second Way" of education reform which he calls GERM, literally meaning the Global Education Reform Movement.

Sahlberg is the "insider" when it comes to the Finnish education system that both Hargreaves and Sir Ken Robinson, another ARC thought leader, believe to be one of the finest education systems in the world. Sahlberg offers what he calls the Fourth Way of Finland as an alternative to GERM. Any system, he argues, can make the same simple design adjustments than Finland has made because the Finish Education System is not some "unobtainable utopia", it remains very doable. The "why" to Sahlberg is quite important and parallels the thinking of other ARC thought leaders and underpins

I am particularly concerned, with many others, of the growing number of those who believe that people from the corporate world have the answer to educational change and that they know best where to go next. Among them are those who insist for more data and performance targets. These same people believe that more competition between schools is the key to more effective education and that pay-per-performance for teachers will attract better people to teaching.[29]

Sir Kenneth Robinson

"One of the reasons you have to think differently about education these days is that the world your children are living in is so different from the one that you and your parents grew up in." Noting that children, families, work, and indeed the whole world is changing, Robinson states in his new book, *You, your child and school: Navigating your way to the best education*, that "education has to take account of this, if it's to help your children make their way, let alone flourish in a world that's changing faster than ever." Governments understand some of this, Robinson contends, but as they try to decide what to do, the emphasis becomes economic and political and this "puts you and your children in the crosshairs."[30]

Though he is a proponent of public education, Robinson supported his own daughter leaving secondary education to follow a learning plan of her own. "And he wants other parents to consider that a nontraditional education — even dropping out — might be what's best for their children. To be sure, Robinson, a strong proponent of public education, does not believe that's a solution for everyone."[31]

In *You, your child and school*, Robinson looks at the dilemma of school reform and change through the eyes of parents and citizens. It's not, he would probably argue, a happy picture, particularly in the United States, but most probably a dilemma across the world. Robinson believes that parents and teachers can be partners in calling for real change, reminding people that "…some of the established routines of schools can cause their own problems. Many of them are habits, not mandates."[32]

How then are select high schools in the United States overcoming habits?

High Technology High Schools

Technology can be just another tool, like a number 2 pencil, or it can help create meaningful change and foster deep learning in both primary and secondary schools. The following high school examples deserve note.

High Technology High School

Faculty members act as facilitators, assisting students in acquiring the communication and information access skills they will need to function as productive citizens in an increasingly technological world. Students are taught to be prudent risk-takers and creative problem solvers in a global society. Achievement of these goals will result in their becoming socially and ethically responsible adults.[33]

With a 2017 U.S. News Ranking of first in New Jersey and 16th in the nation Monmouth County's high technology high school is aptly named, High Technology High School. U.S. News also ranks it as the number one STEM School in the nation. Though the school is racially and culturally diverse (53% minority) and draws from over 45 school districts in Monmouth County, it remains a small magnet school (300 students) and highly academically selective. Only 3% of its students are economically challenged.

While it might rightfully be argued that generalizability of the school's selective admissions policy is limited, its curricular approach of integrating engineering courses, emphasis on group work and real-world problem solving into the curriculum deserves attention. Likewise, its efforts to integrate humanities and STEM are worthy of note.

Highline Public Schools/ Multiple High Schools

I am proud that for the fourth consecutive year our graduation rate has risen in Highline. Guided by our community-driven strategic plan with its bold goals for students, our graduation rate has increased 16.5 percentage points since 2013, to 78.8 percent for the Class of 2017. Even better, all of our student groups have made gains, which means we are closing the achievement and opportunity gaps in Highline. This comes at a time when our students are taking more challenging high school coursework than ever before. - Susan Enfield, Ed.D. Superintendent[34]

Just south of Seattle, the Highline Public Schools enrolls nearly 19,000 students in 32 schools. The Free and Reduced Lunch rate is 63% and over one-quarter of all students are English Language Learners. In fact, an

astonishing 95 different languages are represented in its school district. What contributes to Highline's building success is a combination of technology and personalized learning. Highline is a solid example of how high school change cannot be a "stand alone" but needs to be embedded in a district culture of deep learning.

Highline is showcased by the U.S. Department of Education's Office of Educational Technology, which says the following:

A core instructional component of the (Highline) strategic plan is personalized learning enabled by shifts in instructional methods and technology, including a 1:1 device-to-student ratio achieved over time and blended learning. In the Highline personalized learning implementation plan, every student has shared access to a device in school in the early grades and by high school, every student has 1:1 access both at school and at home. Blended learning combines teacher facilitated instruction, small group work, and technology-enabled individual learning to provide personalization and flexibility of time, place, pace for each learner.[35]

Community and family partnerships also remain a high priority for this district which often employs community-based core planning teams. One such team, meeting for a six-month period in 2016, reviewed the district's small high school concept and developed recommendations on how to ensure a rigorous and equitable experience for all students.[36]

The High Tech High School Network

https://www.hightechhigh.org/

Developed by a coalition of San Diego public leaders in 2000, High Tech High was envisioned as a small public charter school serving about 450 students. Today, it has evolved into a network of 13 schools serving about 5,300 students on three campuses with a 14th school opening in Mesa, Arizona. The network has also grown to include a Teacher Credentialing Program and the High Tech High Graduate School of Education, which offers professional development opportunities for national and international educators. A recent "Deeper Learning" conference (sold out) is one such example of how the network shares learnings.[37]

High Tech High School is guided by four connected design principles—equity, personalization, authentic work, and collaborative design.

A unique aspect of High Tech High is the publication of both student and faculty work. "HTH students and faculty publish their work on websites and in books, because we believe that an important step in the learning process is presenting one's work to an authentic audience."[38] Also published is the project-based work that students have accomplished.[39]

P-Tech

https://www.ptechnyc.org/Page/1

Suppose you created a grade 9-14 high school in Brooklyn, New York right across from a crime-ridden public housing project called Albany House. Suppose in this open enrollment "turnaround" school where failure is defined as quitting, or dropping out, 97% of its freshmen go on to become sophomores. Suppose your students were not only enrolled in traditional classes but had access to "learn anywhere" online courses supported by a battery of web-based resources. Now suppose students had the opportunity to enroll in 4 or six-year programs, earn an associate (100%) or bachelor's degree and where many students go to work in an entry level position with IBM. What would you have?

The answer would be New York's Pathways in Technology Early College High School (P-Tech).

The P-Tech model is now used by 40 schools across the nation and is what might be termed a "second-generation" early college high school. While most early college high schools partner school districts and colleges, P-Tech is unique in that it was co-founded by business; in this case IBM. Today the school stands as a partnership between the NYC Department of Education, City University of New York, NYC College of Technology, and the IBM Corporation.

The partnership came about through a convergence of interests:

After many years of involvement in education and other philanthropic efforts, IBM leadership came to the conclusion that, in order to have a lasting impact, their involvement must be both sustained and systemic. Short-term projects based mostly on writing checks proved to have only limited success. At the same time, the Office of Postsecondary Readiness at the Department of Education was beginning to seek new approaches to Career and Technical Education (CTE). The so-called "next generation of CTE" consists of an emphasis on both college and career readiness skills and competencies through closer alignment with industry and higher education as well as focused pathways that bring students through postsecondary education to a solid career.[40]

In 2016, P-Tech received the Allstate/Atlantic Media Renewal Awards for innovative local approaches to pressing issues affecting communities across the country.[41] Significantly, students at P-Tech are given as many opportunities to succeed as possible. A selective early college high school? Only by geography. The admission requirements are as follows:

"P-TECH is a limited unscreened school, which means that we give preference in admissions to students from Brooklyn who attend an information session or open house. There is no academic screen, meaning we accept students regardless of past grades and school performance. We currently enroll students from all five boroughs, reflecting the diversity of the New York City public schools."[42]

Personalized Learning Schools

What if we were to design high schools that were fully based on mastery and personalized learning? What would these schools look like and how could we sustain them in a culture where traditional instruction predominates? The Carnegie Corporation of New York (CCNY) wanted to find out.[43]

In 2013, CCNY founded its Opportunity by Design (ObD) initiative to support a network of small schools across the country that were based on ten design principles that, if fully implemented, the Corporation believed would lead to a type of school that would look different from the traditional high school. These principles would create a high performing high school that:

1. *Has a clear mission and coherent culture*
2. *Prioritizes mastery of rigorous standards aligned to college and career readiness*
3. *Personalizes student learning to meet student needs*
4. *Maintains an effective human capital strategy aligned with school model and priorities*
5. *Develops and deploys collective strengths*
6. *Remains porous and connected*
7. *Integrates positive youth development to optimize student engagement and effort*
8. *Empowers and supports students through key transitions into and beyond high school*
9. *Manages school operations efficiently and effectively, and*
10. *Continuously improves its operations and model (CCNY, 2013)*

Further, the Corporation believed that certain principles were "power" principles and key to any successful design. These were:

- *Prioritizing mastery: Where students demonstrate deep understanding of clearly defined, rigorous competencies.*
- *Personalizing learning: Where student learning experiences are tailored to individual learning needs and interests.*
- *Positive youth development: Where students have voice in their learning and access to experiences and relationships that help them develop the skills and mindsets to succeed (CCNY, 2017).*

In 2014, the RAND Corporation began a five-year formative and summative evaluation[44] of the project. Though RAND found that implementation of the design principles posed numerous challenges, yet "emphasis on mastery

and personalized instructional approaches) is high across schools and improving over time."[45]

Denver School of Innovation and Sustainable Design (DSISD)

http://dsisd.dpsk12.org/

What would happen if you could have a district managed school, populated with a culturally and economically diverse student body that was totally competency-based and operated with waivers from certain district policies, state statutes and collective bargaining agreement? The answer is that you might come up with a school that ranks "distinguished" and "exceeding expectations" on the State's School Performance Framework Rating.

From flex schedules to public demonstrations of learning, to opportunities to resubmit work (showing learning growth) for higher grades, DSISD holds that "Competency education provides opportunity for recuperating lost learning, identifying and filling in specific gaps in knowledge and skills, accelerating learning and allowing students to extend their learning beyond grade level if, and when they are ready."[46]

The school designs competencies aligned with what it calls its "Four Qualities of Innovator" domains. These are: Personal Academic Excellence, Lifelong Learning and Citizenship, Innovative Thinking and Action, and Transformative Leadership. The school maintains a strong focus on personalized learning, innovation and design thinking in an environment where teachers serve as guides to enable students to determine how they best learn. College and career readiness is also a major focus with AP and dual credit courses starting as early as the 9th grade.

DSISD started with 100 students and will reach full enrollment this year. It remains a model school and, in essence, a small high school but serves as an integral learning experience for the Denver Public Schools (DPS) as the district continues to strive to implement its *Denver Plan 2020: Every Child Succeeds,* whose goal is to have 80% of its students in high performing schools by 2020.[47]

With a portfolio over 200 traditional, innovative, and charter schools and an enrollment of 93,000, DPS is the fastest growing urban district in the nation. In recent years, the district improved its graduation rate by 23% and estimates that 61% of its students are now in high performing schools.[48]Personalized learning remains a high priority for the district.

Kettle Moraine High School

https://www.kmsd.edu/hs

Situated 25 miles west of Milwaukee, Kettle Moraine High School is one of four small high schools sharing a common campus that serves a 90 square mile school district. The four high schools represented are the KM Perform School for Arts and Performance, KM Global School for Global Leadership & Innovation, Kettle Moraine High School, and the High School of Health Sciences. All these schools support a district vision that supports personalized learning. Success as a next generation instructional leader is reflected through the national recognition the district has received as Kettle Moraine High School has twice been named to the Washington Post's list of America's Most Challenging High Schools and has been called among the top 10 schools in the nation by the Daily Beast.

The district's operational stance on personalized learning is reflected in a document entitled "Personal Learning Look Fors".[49] As Kettle Moraine notes, "this document was created to

build understanding and goals as the district continues to move toward the vision of "personalized learning for all". This is not an evaluative document but rather one that recognizes the many small moves required to provide a personalized learning experience for all students. A series of articles on the web site of CompetencyWorks[50] fully relates the Kettle Moraine story and Wisconsin's drive towards personalized education.

While Kettle Moraine has little poverty or diversity, persons looking for solutions as to how to bring students two or three years behind up to speed may be initially disappointed that Kettle Moraine has never had to face the challenges low wealth urban and rural districts confront. Yet, the lesson here is what can happen if teachers and administrators discard the restraints of traditional instruction. Where the "Individual learner interests and passions are the center of the learning."[51]

James Logan High School

http://www.jameslogan.org/

With over 4,000 students speaking 51 different languages, James Logan High School is a public comprehensive high school located in Union City on the west side of San Francisco Bay. While over 25% of its students are recent immigrants from 60 different countries, the school and its faculty integrate technology into instruction with each student receiving a Chromebook and e-mail address, enabling student-student and student-faculty connectivity.

Students also develop a personalized learning plan in middle and high school. It is the district's "…belief that students will be more engaged in their learning and will feel a stronger sense of ownership over their education if they decide what they want to learn, how they are going to learn it, and why they need learn it to achieve their personal goals."[52] To help students develop their plans, the district partners with the California College Guidance Initiative (CCGI).[53]That initiative partners with districts that have the technology to enable students to use the comprehensive college preparation resources available. Students are allowed to develop their own online portfolios that can be shared with educators, advisors, and parents.

The efforts show in that the high school maintains a substantial battery of AP courses, as well as its college prep. mentality. Over 90% of its students plan to go on to college and 62% meet California State College requirements.

Illinois Competency-Based Pilot

For Immediate Release

Thursday, March 22, 2018

STATE SUPERINTENDENT ANNOUNCES SIX DISTRICTS JOINING COMPETENCY-BASED EDUCATION PILOT

PILOT PROVIDES UNIQUE OPPORTUNITY TO REDESIGN HIGH SCHOOL

SPRINGFIELD – State Superintendent of Education Tony Smith, Ph.D., today announced six school districts joining the Competency-Based High School Graduation Requirements Pilot Program in the pilot's second cohort. Representatives from Belvidere School District 100 joined Smith at Belvidere North High School and took a tour of the school's agricultural program, which is part of the district's competency-based model for career pathways.

The 15 total districts[54] in the pilot each have a unique strategy for implementing competency-based learning and teaching. These pilot districts are creatively using technology,

assessments, staffing, schedules, and local partnerships to maximize opportunities for students.[55]

When Illinois Public Act 099-0674 or HB (as enrolled) 5729, also known as the Postsecondary and Workforce Readiness Act was passed in 2016, established a pilot program for competency- based education noting that districts in the pilot program may select which of "…the year and course graduation requirements…the school district wishes to replace with a competency-based learning system. A school district may participate in the pilot program for some or all of its schools serving grades 9 through 12."

Further the law stated that competency-based learning systems authorized through the pilot program shall include all of the following elements:

(A) Students shall demonstrate mastery of all required competencies to earn credit. (B) Students must demonstrate mastery of Adaptive Competencies defined by the school district, in addition to academic competencies. (C) Students shall advance once they have demonstrated mastery, and students shall receive more time and personalized instruction to demonstrate mastery, if needed. (D) Students shall have the ability to attain advanced postsecondary education and career-related competencies beyond those needed for graduation. (E) Students must be assessed using multiple measures to determine mastery, usually requiring application of knowledge. (F) Students must be able to earn credit toward graduation requirements in ways other than traditional coursework, including learning opportunities outside the traditional classroom setting, such as Supervised Career Development Experiences.[56]

Illinois is not the first state to acknowledge competency-based education or personalized learning. Indeed, the state might be called a "late adopter" of the concept. What Illinois has done, however, has been to design the framework for a pilot that can be very expansive. Even then, there are limitations. The state provides no funding for the pilots and schools and their districts work to actively confront many of the practical issues surrounding parent and public perceptions and transition from traditional instruction and grading systems. A recent Chicago Tribune article outlines many of these challenges.[57] The article relates, for instance, how one principal had to reinstitute a GPA system on transcripts because of concerns surrounding college admissions.

If the Illinois pilots persist and are able to broaden their impact to the entire state, they will provide invaluable lessons for those looking at competency-based and personalized learning.

Vista High School

http://vhs.vistausd.org/

In 2015, Vista High School, in the Vista United School District south of San Diego, was one of 10 winners of XQ: The Super School Project to be awarded $10 million by XQ Institute to reimagine the high school experience for today's youth. This past fall (2017-18 school year) the school's freshman class of 670 students, along with 30 faculty embarked on a new personalized approach to learning. Key to the redesign was the formation of six "houses" in which approximately 130 students will be supported by four teachers. While all freshmen take core courses, two specialized courses underscore the school's new approach to personalized learning.

Operating with the slogan, "local power, global impact", students take what are called the challenge course and the wellness course. In the challenge course, then dispositions are:

- Students build a understanding of global literacy

- Students understand pressing global challenges
- Students build empathy around global issues /problems in a multidisciplinary manner
- Students take action to improve our world

Specifically, students are to explore the United Nations Sustainable Development Goals to find an issue that resonates with them, identify a problem, iterate solutions and act to improve their world.

The wellness course focuses on soft skills. Here, students explore who they are, focus on wellness and metacognition, and learn to become self-directed learners with the goal of becoming "mindful, ethical, productive and healthy" members of their community.[58] The wellness course is supported by a team of eight teachers who circulate between houses.

Vista High School remains very much a work in progress and is still in a sense "piloting" personalized learning. Vista is one of 18 high schools now featured on the XQ Super Schools High School Redesign site.[59] HQ is an independent affiliate of the Emerson Collective, led by Laurene Powell Jobs, the widow of Steve Jobs.[60]

Do We Need to Challenge Our Assumptions About What Needs to be Taught and Learned?

There is no way that the vast majority of teachers, whatever their training, can ever hope to match in their classrooms what students can receive at will from sources of their own choosing – Russel Ackoff and Daniel Greenburg[61]

Ackoff and Greenberg would maintain that we confuse learning with teaching. These are two entirely different things, yet our systems, ranging from national efforts like common core standards, to classroom delivery are designed around teaching. If we institute reforms centered on teaching, the outcome, hopefully, might be increased efficiency, i.e. how much content is learned. Despite all our reforms, there is (and has always been) a finite limit to this, measured by such things as standards, curricula, and seat-time. Yet, if the focus is student-centered and focused on deeper learning, and how to learn, the outcome is continuous learning and growth.

If this is the desired outcome, the American High School and its peers around the world (literally now our competitors) may be facing a whole new set of "essential" questions. These questions may guide how we create and structure high schools for the future:

What core knowledge and skills do students really need?

How can these be built upon, or modified, to ensure ongoing and effective participation in a dynamic self-regenerating local, or regional, economy?

Given the merging blend of AI and emerging technologies with human intelligence, what do we really need to know and when?

We need to know how to ask questions, how to diagnose a situation, not necessarily how to solve the problem (that will emerge later); yet, we need to know when the correct questions have been asked and finally;

Do soft skills now trump hard skills? We should perhaps consider the following attributes of a high school student included in Ohio's Draft Strategic Plan for Education that mixes both:[62]

- Foundational knowledge and skills—The graduate will have command of basic skills in mathematics, English language arts and technology—the building blocks that enable future learning. Specific to technology, the graduate will understand its global impact and use it to design solutions, communicate ideas and share information.
- Well-rounded content—The graduate will have exposure to social studies, sciences, languages, arts and physical education.
- Critical-thinking and problem-solving skills—The graduate will demonstrate strong decision-making skills, know how to analyze issues and approach complex challenges.
- Resiliency, grit and work ethic—The graduate will demonstrate follow-through and have the wherewithal to "stick to" challenging problems until a solution is identified.
- Communication—oral and written—The graduate will be an effective communicator who can clearly articulate his or her thoughts verbally and in writing.
- Engaged citizens—The graduate will productively contribute to society and engage in the democratic process (for example, vote on a regular basis).
- Cultural awareness—The graduate will hold a world perspective that values and respects diversity and the establishment of meaningful relationships.
- Collaboration and teamwork—The graduate will cultivate skills necessary to work with others and understand cooperation and compromise.
- Adaptability and agility—The graduate will exercise flexibility when necessary and seek to continuously learn and process new skills.
- Social, emotional and interpersonal skills—The graduate will express and manage his or her emotions and establish positive and rewarding relationships with others.
- Curiosity, discovery and growth mindset—The graduate will ask thoughtful questions, dig deeply into issues and understand that improvement results from his or her own learning.
- Gathering information and discerning that information—The graduate will be intentional about receiving information from multiple, reliable sources and making sense of that information.
- Innovative and creative—The graduate will think differently about problems—considering multiple angles of approach—and integrate skills and knowledge across disciplines to identify solutions.

Few would argue with this list. Yet, can we design and sustain high schools capable of doing all of this? In 2015, with a grant from the Carnegie Foundation, the Center on Reinventing Public (CRPE) Education published the *Case for Coherent High Schools*.[63] Coherent high schools according to the Center have explicit values, hold students to high academic expectations, provide academic supports, create meaningful relationships, and demonstrate the links between school and life. Such schools according to CRPE exist but are rare. This is because, "such schools are difficult, though not impossible, to create and sustain within the constraints of most traditional school district structures, teacher collective bargaining agreements, and age-old policies about how students use their time."[64]

Despite general agreement among many of the great reformers of the 1990s (Hirsch and Sizer, and the studies by Coleman, Bryk, Hill, and others) as to many of the elements of what could constitute a coherent high school, no general theory ever emerged. Everyone did their own thing. What does it take to develop a coherent high school? One of the *Case* authors came up with the following "start-up" list:

1. Start with a worked-out theory of youth development, whether based on religious- or research-based principles, and whether encoded in literature or a strongly established tradition.
2. Found the school around a few individuals who fully understand this tradition and what it implies for teaching and student guidance.
3. Make the school's core ideas as explicit as possible so that the ideas ground conversations in the school community and so that newcomers, whether teachers, students, or parents, easily understand them.
4. Build a school culture that conveys unwavering expectations and academic standards for all students that are rooted in the legitimacy of the school's core principles and its demonstrated ability to produce effective graduates.
5. Use extensive internal communication to establish a dynamic organization that adapts and responds as a single entity to new challenges in light of the school's basic principles.
6. Build strong external constituencies of three kinds: customers (families who trust the school and rely on it to educate their children), external supporters (funders and intellectual mentors who buttress the school financially and educationally), and validators (employers and higher-level schools to which students aspire and that can provide feedback on the school's performance).
7. Keep control of funds and key decisions about hiring and curriculum.
8. Satisfy parents by keeping promises, not by compromising principles, and keep the initiative on accountability—asserting what results the school hopes to attain for students, dxwhere it is now failing, and what it will do next.[65]

All across the nation, we have examples of innovative and deep learning high schools. Often difficult to create; they are even more difficult to sustain because they often run counter to state (and national) policy, tradition, public perception and deeply ingrained habits. Yet, in poll after poll, the American public says it wants its high schools to change.

Yet, what the late Ron Edmonds said many years ago, remains powerfully true for high schools today. "We can, whenever and wherever we choose, successfully teach all children whose schooling is of interest to us. We already know more than we need to do that. Whether or not we do it must finally depend on how we feel about the fact that we haven't so far."[66]

Part of the reason is that what we need to do can, and probably must, vary from community to community. Sir Kenneth Robinson may have the best summary of, given what we know, what we have not broadly done "so far".

They (successful schools) recognize the job is to cultivate passion and interest in learning in kids. And if they don't do that, then nothing else works. If nothing else, if you can get kids interested and engaged, if you can excite their curiosity, if you can get teachers to see that teaching is a collaborative activity… then you can get people working in teams, you can get people cutting across false boundaries of subjects, you can get people working in different age groups. You can get remarkable results. There isn't a single way of doing it. There is no one way to do rock 'n roll. No one way to decorate the house. That's where the creative stuff comes in. You want to personalize it, you want a community of learners. You want to engage with the broader community, of parents, businesses, local organizations so it becomes a collaborative, curiosity-driven process.[67]

Ultimately, Robinson would argue, school needs to become more personalized for students and more customized to the communities they are in. This does not mean that we shed all notions of standards or accountability. Since the Massachusetts school ordinance of 1647, public education in America has been inexorably tied to local communities. It is here, not in state capitals, or Washington, at the point of delivery, that innovation can be sustained and where deep learning occurs.

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