Critical Issues Document: Rethinking Education

"Education is the most powerful weapon you can use to change the world."
Nelson Mandela Launching the Mindset Network, 2003

Purpose of this Document

This document outlines a set of challenges for the future of education, focusing not just on the Western countries but also on the global south. In doing so, the intention is to establish a basis for an inspired conversation. It is derived from a journey which many have been involved with for over forty-five years – researcher-colleagues, colleagues in teacher professional organizations and unions, colleagues who work with students every day in classrooms around the world. What this document seeks to capture are the issues, challenges and opportunities educators and policy makers now need to address.

The focus is strongly on primary, secondary and school-based education, though higher education occasionally gets a mention. The reason: public education for students in primary and secondary education remains a challenge for many nations and the performance of established systems of school education is seen by many to be problematic. Primary and secondary education (both junior secondary and senior secondary) remain the bedrock of our approach to citizenship, essential skills and social engagement. As the foundation for all that follows, these levels of education should be our focus.

The Key Challenge Being Addressed in this Paper

This paper does not address all of the challenges in terms of equity, performance and effectiveness of education. Instead it focuses on ten critical issues which have an impact on the daily lives of learners and their teachers, with an emphasis on compulsory schooling.

Its focuses strongly on the need for a commitment to public education rather than private education – seeing education as a public good. It also focuses on equity of access and outcome as an underlying challenge and principle that should drive educational policy and practice.

The paper is informed by a fifteen-year journey focused on the idea of a great school for all, which requires a focus on building the adaptive, collaborative capacity of each school to respond to the specific needs of the students and teachers within the building. While education "systems" are important, the key unit of focus is the school as an organization which can make choices.

The Sponsor of this Paper

This paper has been written by Stephen Murgatroyd[1] who has spent close to fifty years working in and around schools. He worked with Professor David Reynolds (University of Swansea) on projects related to school effectiveness; with Professor Pasi Sahlberg (Gonski Institute, University of New South Wales formerly Harvard University) on issues of public policy in education; with Professor Andy Hargreaves (Boston College), Professor Dennis Shirley (Boston College), Dr. J.C. Couture (Alberta Teachers' Association) and Jean Stiles (Principal, Edmonton Public Schools) on issues associated with the requirements for creating a great school for all; and with a variety of other collaborators of counselling and teaching young people. He has worked in Britain, Finland, Norway, US, New Zealand and Australia on educational issues and presented at keynotes to educators around the world. He has written and edited several books focused on education, about both schools and higher education, and has been a frequent contributor to other books, journals and magazines. Stephen is based in Edmonton, Alberta, Canada.

Assumptions Behind This Paper

So as to facilitate a conversation – both online and in-person, certain assumptions have been made:

1. That education is a public good and needs to be driven by public processes.
2. That equity of both access and outcomes is a major driver for public policy with respect to education.
3. That teaching is a profession which requires the support, recognition and respect of the public.
4. That teaching, and learning is what takes place in school – learning can take place anywhere, but schools are a place in which teachers make a difference.
5. That the purpose of school is broader than preparing students for the world of work – that is as much about citizenship, social awareness, critical thinking, finding a specific passion and cultivating it than it is about skills and competencies.
6. That curriculum – the focus for the work of teachers and learners in schools – should be flexible and adaptable by professional teachers to reflect the reality of their classrooms.
7. That assessment and feedback are intended to support teaching and learning and are not intended as vehicles to hold teachers and learners accountable against some performance standard which is arbitrarily imposed.
8. That different students require different supports so as to achieve their potential as learners – students with special needs, disabilities, gifted students, students who dance or are artistic all need different kinds of support to enable them to be successful.
9. That the public deserve to know how their schools are performing, but this public assurance should not become the driver for teaching and learning – the needs of learners should drive what happens in school.
10. That the role of Government and its agencies is to support the professional work of teachers and provide the resources to enable effective schools rather than to command and control what teachers and schools do.

These are "big" assumptions and are clearly open to challenge.

The Big Systemic Issues in Education

When we look at the critical issues facing educators around the world, these ten appear the most important and provide a starting point for the suggestions which follow:

1. **The poor performance of many public education systems on many dimensions of learning**. The World Bank's 2018 review of the world's education systems suggest that many school systems are permanently failing organizations. This is true, worldwide – with the US, for example, spending in the US per student is higher than most other places in the world, and yet student outcomes are (at best) modest and, in some areas, poor (see here). Here is the opening paragraph of the World Bank review:

   > "In Kenya, Tanzania, and Uganda, when grade 3 students were asked recently to read a sentence such as "The name of the dog is Puppy," three-quarters did not understand what it said. In rural India, just under three-quarters of students in grade 3 could not solve a two-digit subtraction such as 46 − 17, and by grade half could still not do so. Although the skills of Brazilian 15-year-olds have improved, at their current rate of improvement they won't reach the rich country average score in math for 75 years. In reading, it will take more than 260 years. Within countries, learning outcomes are almost always much worse for the disadvantaged. In Uruguay, poor children in grade 6 are assessed as "not competent" in math at five times the rate of wealthy children. Moreover, such data are for children and youth lucky enough to be in school. Some 260 million aren't even enrolled in primary or secondary school."

   They challenge that: (a) learning outcomes are low relative to both need and return on investment; (b) schools are failing learners – some 500+ million learners around the world have poor learning outcomes from the years at school ; and (c) systems are failing schools. They point to a variety of reasons for these poor outcomes, but key amongst them are: (a) the focus is on management of systems, not learning – there needs to be a relentless focus on learning, which will be a major shift in many systems; (b) key players do not always want to prioritize student learning – technology, teachers, buildings, money are seen as more important; (c)

there are too few measures of learning – not too many; (d) inequality is too high – equity not just of access but equity in outcomes are key; and (e) political leaders who make policy do not show the patience needed for outcomes to be demonstrated. See World Bank Report here. It should be emphasized that, while this quotation relates to emerging economies, the same issues are seen world-wide.

A particular component of this challenge is literacy. In Canada (and many other developed countries), app. forty per cent of the workforce does not have essential skills needed to apply their technical skills and knowledge at globally competitive levels. Investing in upgrading essential skills would provide Canada with an opportunity to change the productivity narrative. While some investments are being made, we need to focus on investments with proven efficacy and outcomes. We also need to significantly improve the essential skills of all those at schools, colleges and universities – more and more of them will need higher levels of essential skills than they currently possess. There are a growing number of innovative approaches to this work – some captured in the Barbara Bush $7 million X-Prize for Literacy[2] which is now entering its final phase – both online and mobile learning can help here too.

2. **Policy Tensions – GERM *versus* Equity**: In seeking to improve school performance, there has emerged a tension between the global education reform movement (standardization, privatization and competition, high stakes testing) and equity-based policies (collaborative professional autonomy, flexible curriculum, formative assessment more important than summative, public education rather than private). This tension shows itself in capitalist economies but also in emerging economies which are increasingly relying on private providers. In responding to the performance challenges outlined by the World Bank (and others), policy makers and politicians are pulled in many directions, yet the evidence base is clear: policy decisions focused on learners and learning coupled with equity are what lead to high performing systems. See here for a review of this challenge.

3. **The capture of public education by private interests**. This is connected to the previous challenge, but is also distinctive. A growing number of public-school systems in the global south and the west have been captured by commercial interests – book publishers, test providers, technology providers, assessment and reporting system providers. This is the defined strategy

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[2] See https://adultliteracy.xprize.org/

of companies like Pearson and McGraw Hill. In higher education there are the providers of predictive analytics solutions, providers of online learning solutions (so called OPM's – Coursera, 2U, Universities Australia) and learning management systems (D2L, Blackboard). In school systems, continuous reporting systems (PowerSchool, PraxiSchool, Grade Link) and AI enabled adaptive assessment systems (Brightspace, Alex) are all examples of pervasive systems which impact the processes involved in teaching and learning. The education market is seen as a $6.3 trillion global market and is seen as "ripe" for transformation and change – attractive to companies seeking to offer "solutions", products and services. Private involvement *can be helpful*, but most often it is focused on revenue capture and market share, not supporting learning or strengthening the professional role of teachers.

4. **Education as a Tool for the Maintenance of Inequality**. The massification of higher education in the 1960's in the developed world (and many regions of the emerging economies) and the expansion of compulsory education world-wide was seen as enabling the "rise of the meritocracy" – increased social and economic mobility based on education and merit. In some parts of the world, education has made a difference to some aspects of equity, but in others it has not. For example, girls and women have challenges in moving beyond primary education in many parts of the world and in others, First Nations and aboriginal persons rarely succeed at the same level as other citizens in their own countries. Globally, the expansion of higher education has secured access to higher education for those already positioned to benefit – the middle and upper class. The basic structure of education systems affects equity. Traditionally, education systems have sorted students according to attainment. Evidence from studies of secondary and primary schools suggests that such sorting can increase inequalities and inequities, particularly if it takes place early in the education process. Early sorting can also weaken results overall.

5. **The new imperialism of data and growth of datafication**. When the OECD began its work on the Program of International Student Assessment (PISA) it was seeking to better understand the components of high performing school systems. Using standardized testing for a sample of students, it ranked countries by student performance on measures of literacy, numeracy and scientific competency. It then sought to understand why some public education systems performed better than others – identifying and measuring key system components. This then created a "racetrack" for countries and jurisdictions which   competed with others for position on the PISA league table (Sellar, Thompson and Rutowski, 2017). Some Ministers challenged their teachers to move their country "up the PISA table" (e.g. Wales, Australia) and others saw the PISA data as revealing that they had a "math crisis" or "STEM crisis". OECD now is also assessing what they call "global competencies". There is no doubt that PISA is driving public

education policies in many parts of the world rather than simply providing another source of insight. This is just one example of this trend for datafication - "datafication" refers to the use of data in a way that has become increasingly detached from supporting learning and is much more concerned with the management of teacher performance as an end in itself. School systems in various parts of the world – e.g. Australia, England – see data as a management tool to the detriment of teaching and learning.

6. **Personalization versus Learning and Teaching**. Technologies and commercial interests are pushing the idea of "personalized learning" – using technology to customize the process of learning to the needs and performance of individuals. Adaptive technologies, AI and robotics enable this with the support of a teacher. This approach focuses on consumption of educational material (content, assessment, algorithms) and the power of technology (itself a privilege) instead of interaction with meaningful provocations and interaction with others. The "beautiful game of education" is, according to Gert Biesta (a philosopher of education), is about exploring, understanding, sharing and learning. – not passing a variety of assessments (formative or otherwise) and not doing so alone. Indeed, the danger of "personalized" learning is that it promotes knowledge and understanding as a commodity which can be mastered and places self-interest above social and community-based learning. It is also seeks to minimize teaching and encourage the facilitation of learning. The term "learnification" has been used to capture this work – learning becomes a process which can be commodified, not a process which leads to enlightenment.

7. **The De-Professionalization of Teaching**. In Uganda, teachers are provided with such detailed instructions of what should happen in every classroom at every grade for every school for every minute. So specific are the instructions, that they include pauses, questions to ask and comments to make on the specific answers that may be given. It is an example of governments assuming that the teacher is mindless and not able to make their own decisions – in this case, the Government commissioned Bridge International Academies (supported by the World Bank, Pearson International, Gates Foundation and the Zuckerberg Foundation) to develop these resources for their schools[3]. Other Governments are not as blunt and direct – they crowd out the work of the teacher with over-burdened curriculum, assessment activities, reporting (now quickly becoming a daily activity – another feature of datafication), required professional development and accountabilities. The art of teaching and, most importantly, the ability to make judgements about what to teach, when and to whom is being lost in the pursuit of

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[3] See this story in the Washington Post https://www.washingtonpost.com/news/answer-sheet/wp/2016/06/09/the-weird-story-of-the-arrest-of-a-canadian-education-researcher-in-uganda/?noredirect=on&utm_term=.ddf8963bbc79 and also https://www.ei-ie.org/media_gallery/DOC_Final_28sept.pdf

"standards". Professor Richard Milner, the Helen Faison Endowed Chair of Urban Education at the University of Pittsburgh, looked closely at the issue of de-professionalization in a policy brief he wrote for National Education Policy Centre. He grouped teacher de-professionalizing activities into three broad categories: (1) alternative (fast-track or no-track) teacher preparation and licensure; (2) the adoption of policies that evaluate teachers based on students' test score gains, and specifically, those based on value-added assessment; and (3) scripted, narrowed curricula. The first two of these were mentioned above, and the third is a natural consequence of the first two. In many jurisdictions (US, England, Australia) these tendencies and others are making being a teacher a challenge and making substitution by both unqualified persons and technology more likely.

Recently, Fareed Zacharia raised this issue in his CNN broadcast GPS. His focus was on the changing perception of teachers in the community: once a role model and thought leaders, highly respected in the community, they are now seen as being more like technicians delivering programs designed by others supported by technology which they had no role in designing. It is makes it more difficult for them to be effective as teachers exercising professional judgement when this is the case.

8. **Declining Per Capita Investment in Public Schools and the Growth of Private Schooling**. Public education is a public good and the basis for a great many features of community and civil society. In the England and Wales, for example, spending on public education increased annually between 1956 and 1997 by an average of 3.7% but was cut as part of austerity measures following the spending review of 2010[4]. Similar developments occurred in the US – where 29 States were providing less funding per capita in 2015 than they were in 2008[5]. In higher education a great many jurisdictions have reduced per capita spending of students (and raised tuition through debt mechanisms and increased revenues to colleges and universities from international students). While globally expenditure on education grew, so too did the number attending school. As more jurisdictions deal with debts and deficits through austerity measures, they either maintain an education budget and not adjust for inflation (Netherlands) or reduce per capita spending (Ireland, Greece, US, Latvia, UK). At the same time, a great deal of privatization has occurred not just in terms of schools but also through the growth of tutoring. This leads in some jurisdictions to a great deal of fragmentation of the education system and to competition.

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[4] See https://www.ifs.org.uk/bns/bn121.pdf
[5] See https://www.cbpp.org/research/state-budget-and-tax/a-punishing-decade-for-school-funding

9. **Pseudoscience Masquerading as Truth**. In some parts of the world, John Hattie's 2008 *Visible Learning* is a policy bible, since it claims to contain a meta-analysis of the evidence about education which then suggests what actions can be taken to improve both school and system performance in relartion to learning outcomes. He looks at "effect size" (for example, to what extent does class size make a difference to learning outcomes?) and reviews all studies related to the effect under scrutiny to calculate an average effect size. The book is full of basic statistical errors (miscalculations and inappropriate baseline comparisons, to name two) and claims that cannot be supported by the evidence - class size having no significant effect being one. A recent review by a leading Canadian statistician concluded that "in summary, it is clear that John Hattie and his team have neither the knowledge nor the competencies required to conduct valid statistical analyses. No one should replicate this methodology because we must never accept pseudoscience." Yet, others have found this book (and several others like it in the past) as like "the Holy Grail of education"[6] . Education seems unusually prone to such works – claims related to the performance of certain methods and policies (e.g. brain-based teaching[7], whole language instruction for the teaching of reading[8], the use of school vouchers as a basis for educational choice[9]) that it sometimes looks more like homeopathy than medicine. Diane Ravich captures some of this in her 2014 book *The Reign of Error – The Hoax of the Privatization Movement and the Danger to America's Public Schools* in which she explores the evidence that the introduction of competition and private sector approaches improves educational outcomes and can find no compelling evidence in support of this proposition having a positive impact on school performance.

10. **Judging Schools as if They Were All the Same**. Test scores, in particular scores on high stakes tests (PISA, A level and GCSE results in the UK, performance on grade tests in the US and other countries), are sometimes used to produce league tables of schools by both Governments or private organizations (e.g. Best Schools in the UK, Fraser Institute in Canada). Such league tables do not account for the "inputs" (socio-economic mix, ethnic and language mix, number of students with special needs, etc.) to the school – what the students are like, what the catchment area is like, what the teachers in that school have as skills and competencies and what resources the school has available. Some governments then use these league tables to enact "special measures" – requires changes of leadership, retraining for teachers, focused policies to deal with specific issues, etc. Despite the lack of evidence of the

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[6] See https://voir.ca/normand-baillargeon/2014/02/23/visible-learning/
[7] See http://amyalexander.wiki.westga.edu/file/view/bridges+over+troubled+waters-p.pdf/238143441/bridges+over+troubled+waters-p.pdf
[8] See https://www.theatlantic.com/magazine/archive/1997/11/the-reading-wars/376990/
[9] See https://www.cityandstateny.com/articles/policy/education/do-school-vouchers-work.html

efficacy of these special measures[10], their use in several US states and the UK has encouraged a variety of school leaders to game the system[11]. Each school, even in the same district, in unique and has its own culture and performance expectations. Rather than looking at a single standard as the basis for performance – which can be helpful for benchmarking and strengthening goals – schools need to be assessed and held accountable for their own development plan against their own goals.

These ten challenges suggest that there is a great deal to do to support teachers and students in their desire to learn and create success for themselves and their schools.

Possible Actions

A word of caution: the rush to "solutions" is fraught with problems – it is a bit like running with scissors or competing in a Formula 1 race with a Ford Taurus. These are suggestions aimed at triggering a response which in turn should lead to "better" suggestions for action.

These are also very Western and Northern Hemisphere views of the world. While I have worked in the Middle-East, visited Africa, India, many countries in the Pacific and spent time with educators from around the world, my deep experience and thinking is Western (especially Canadian / British). My colleague Paul Prinsloo of UNISA (South Africa) carefully reminds me of this by sharing research and studies of the ongoing impact of colonialism, of poverty and of other factors which lead to very different challenges and solutions in the Global South.

Our focus needs to be upon creating the most effective conditions in which teachers can teach and learners can learn. Learning here means more than securing good results on tests of competencies – it means pursuit of ideas, mastery of knowledge, creating, engaging, inspiring. The beautiful risk of education needs to permit risk taking, learning from failure, professional judgement and the creative response to the challenge of learning together as well as learning alone. Here are the possible actions which could support this in relation to public education and the school system:

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[10] See https://www.tes.com/news/horror-special-measures
[11] For example, see https://www.thestar.com/news/canada/2018/01/05/ex-principal-facing-charges-after-being-accused-of-tampering-with-ontarios-literacy-test.html and https://www.washingtonpost.com/local/education/eight-atlanta-educators-in-test-cheating-case-sentenced-to-prison/2015/04/14/08a9d26e-e2bc-11e4-b510-962fcfabc310_story.html?utm_term=.7b0508f19150

1. **Focus the education system on the four pillars** of education suggested in 1996 by UNESCO in the Delors report Learning – The Treasure Within. This recommended that the work of schools should be focused on:
   a. Learning to know
   b. Learning to do
   c. Learning to live together, learning to live with others
   d. Learning to be

   The implication here is that our focus should be on the development of the person in the context of learning, skills, collaboration, compassion and social engagement. Skills are important, but they need to be pursued in the context of these broad goals. We need to focus on building a sense of identity, strengthen the skills for learning for life, focus on activity based leaning and build a collaborative environment for learning. Some call this a commitment to deep learning, contrasting this with the surface learning required to pass a test and then forgetting what has been "learned".

2. **Strengthen early childhood learning experiences**. While some have seen this as "starting school early", the real focus for early childhood education needs to be strengthening curiosity, creativity and collaboration through play while building some competencies with language and number. Several studies show that the economic impact of investments in early learning in North America are between $7-$17 per $1 spent.

3. **Drive public policy with a focus on equity** – a great school for all. This requires differentiated instruction, inclusion of learners with special needs, leveraging digital technologies to support differentiated instruction and creating learning environments that encourage collaborative learning. Digital technologies in which teachers have been engaged in designing and deploying and which permit collaborative and peer to peer activities can be supportive here.

4. **Strengthen work on essential skills** – the fourth industrial revolution requires more of our learners to achieve levels 4 and 5 on the 5 point literacy scale used to assess literacy. Right now, too many learners leave their educational experience with levels 1-3. This means that many do not have the language, numeracy and cognitive skills they need to respond to the challenges and opportunities associated with many jobs. Strengthening literacy and numeracy and the other essential skills (including emotional intelligence) can have a significant impact on

productivity, job-satisfaction and health. It should be clear that these skills are all developed in a context – through the study of subjects, skills and competencies – and through social interaction. Education should be thought of as a holistic endeavor, not like learning bits and pieces.

5. **Strengthen the training and professional development for teachers and provide appropriate conditions of practice**. A key to improving learning is to enable teachers to exercise collaborative professional autonomy. Teacher selection, training and support coupled with their conditions of practice. Build communities of practice locally, regionally, nationally and internationally and share effective practice openly. Teachers also deserve the trust and professional respect afforded to other professionals (e.g. doctors, lawyers) so that there are able to exercise without threat their professional judgement.

6. **Refocus curriculum**. Programs of study (published curriculum guidelines) vary from very flexible programs to programs that specific exactly what teachers should do every hour or every school day. While teacher expertise and conditions of practice vary greatly around the world, one barrier to success for learners is the over-crowding of the curriculum with "stuff" and minimizing the room for professional judgement. Teachers and learners need "room" to be creative and respond to learning opportunities in the classroom. It is important that **all** students are receiving a well-rounded education so that they can both navigate the world and become active and critical citizens. You cannot navigate a life with just literacy and numeracy. At the same time, the curriculum must be flexible enough so that students and teachers can pursue some of their particular interests and talents. However, it is important to remember that special interests are often formed while in education and are born out of the education process. In fact, education is all about fostering new interests and talents.

7. **Strengthen school leadership and focus the work of leaders on learning and supporting teachers.** Too much leadership time is spent reporting, accounting, and attending meetings about reports and accountability. More time needs to spent building a culture of learning and performance and supporting teachers. More attention to school leaders as enablers of learning, supporters of risk taking and network connectors for next practice. School leaders need to be supported in their attempts to develop agile and adaptive schools.

8. **Make assessments helpful to learning**. Too many assessments undertaken by students benefit systems administrators. Assessments needs to be for and about learning. The World

Bank and others are right in saying that we do not have enough assessments for learning – we have too many assessments of learning, many of which do not assess the competencies which learners need and are specified in the agreed curriculum. We need to get this balance right so as to enable and support deep learning.

9. **Strengthen public assurance**. We need to change the language and focus of accountability. We need to focus more on public assurance – helping schools share their intentions and outcomes with their stakeholders. This means less reliance on outcomes in numeric form (test results), and more narratives about what the schools are doing and how the schools' students are succeeding in median and longer term. Examples of this can be found in school development plans and reflective reviews of progress[12].

10. **Make life-long learning more than a slogan**. Learning is already something we each need to commit to throughout our lives – to stay healthy, to be active citizens, to be creative at work, to live meaningful lives. This is a major system challenge (captured in the sustainable development goal 4). But is also a challenge to instill in learners at all levels the love of learning new materials and skills, all the time. It is about the hard work to develop intrinsic motivations in a commercial world that is bent to feed us extrinsic motivations as shoppers and consumers.

These are broad headings. We need to make these challenges more concrete and meaningful, adapting them for each jurisdiction. We also need to more fully appreciate and trust the professional judgement of teachers – enabling and empowering them to do what they need to do for their learners to be successful in their own terms.

In terms of the adult skills agenda, which many countries now struggle with – the gap between the skills available in the workforce and those needed by employers is not shrinking – for young adult and adult learners we need to:

1. **Modularize all skills-based programs** so that a defined trade or profession is made up of key components – understanding and skills modules - which firms and learners can "mix and match" to their needs. This enables new trades and professions – nano-medic, vertical farmer, AI investigator, narrowcaster, waste data hander, robot repair specialist – to quickly

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[12] See Murgatroyd, S (2011) *Rethinking Education – Learning and the New Renaissance*. New York: Lulu Press / Edmonton: FutureThink Press.

emerge by adding new modules to the pool of modules available. Skills modules could then be made available on a just-in-time basis, removing the idea of start dates. Learners can "stack" modules to secure certification in a defined trade. This would also facilitate reskilling in the fast-changing world of skills and trades.

2. **Move all of the learning which does not require "hands' on" experience to an online environment** – and make these learning modules available 24x7 as MOOC's so that learners and their employers do not pay for learning, only for skills and competency assessments. Hands on learning can be achieved through workplace learning, especially if supervision and assessment are also making effective use of online tools (video recording skills, real time video of an apprentice performing a skill, peer assessment, self-assessment using online tools). Increasingly, ways are being found of creating peer learning networks for these learners and finding ways of connecting MOOC learners for face to face learning opportunities.

3. **Make skills certification about legally demonstrable skills, not time served** – skills are assessed by trained assessors (using video based evidence) and validated by a qualified validators. A person either possesses a skill or they do not. How they acquired that skill and how long it took to do so are of marginal interest. We could establish both virtual and local assessment centres for skills to enable anyone at any time to have their skills assessed. New developments in assessment enable skills to be assessable 24x7. While this limits what can be assessed to very specific competencies rather than aptitudes, dispositions and the conoplexities of understanding, it is nonetheless a way of enabling more resources to be dedicated to what matters most – deep learning.

4. **Leverage technology to make skills learning both effective and fun** – many apprenticeship students report a high level of boredom with the way in which they are asked to learn. Yet simulation technologies, gamification, new used of augmented reality could make learning both more powerful and effective and more enjoyable. Redesigning classroom learning, learning on the job and finding ways of integrating theory and practice in creative ways will also help. Fun and effective learning are not mutually exclusive. Some of the new approaches to coding, robotics education and learning about artificial intelligence show just how powerful such learning can be.

5. **Support the growth of innovative approaches to learning evidenced around the world**. Not only do we have examples in trades education of real innovative uses of

technology for learning, of effective public:private partnerships, of deep collaboration between colleges and polytechnics offering skills programs, we also have a vibrant private online learning sector. A community of practice focused on new approaches to skills and incentives for rapid prototyping of new approaches to skills education would help cement a new era for life-long learning. We need to learn to take risks, learn from mistakes and be creative in our approaches to fast changing demand for skills, learning and education. In doing so, the focus should be on learning and the learner.

Next Steps

This paper is intended to stimulate conversations and callings – both online and in person. The online forum can be joined at www.rebase.camp (login by invitation only—contact Chris if you don't yet have yours) and the face-to-face basecamp is being held in Toronto on 14th November 2018. Your invitation has already been issued.