

SKILLS FOR A
CHANGING WORLD

August 2017

Meaningful Education in Times of Uncertainty

Collection of Essays



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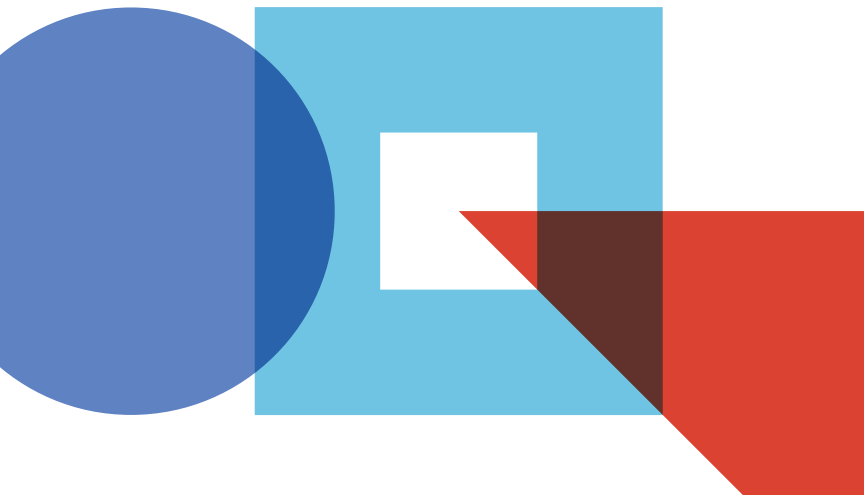
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We are living at a time of enormous uncertainty.

Technology is advancing at an ever-increasing rate, transforming the nature of work and employment. Widening inequality threatens to further disrupt our systems and to leave a large part of the world behind. And as a result, our political systems are increasingly facing an isolationist backlash.

Change is happening at a disorienting pace and our institutions can barely keep up.





That's why, in March 2017, we convened a meeting of top thought leaders in the fields of learning, innovation, and technology. We asked them: how can we rapidly accelerate progress in education—not only to help marginalized communities catch up to where the privileged are today, but also to reach a more effective, holistic, and equitable education for every child in the world?

This collection of essays represents the outcome of those discussions. It addresses some of the most urgent and important issues of our time.

Part One: Cultivating Global Citizens looks at how schools can respond to some of the destabilizing problems we see in today's world. What role can education play in shaping societies and institutions, preparing creative workers, and closing political and economic equity gaps?

Part Two: Teaching and Learning delves deep into specific solutions that have the potential to accelerate education progress. How can pedagogical methods change in order to better cultivate the breadth of skills that young people need?

Part Three: School and Technology addresses the new digital and interactive tools that can be integrated into the learning experience. Under which conditions will they be most useful? Can big data redefine what can be achieved? And, can algorithms facilitate greater equity and wider access to quality learning?

Part Four: Systems Change is about the ways in which education solutions garner acceptance, buy-in, and ultimately become commonplace. What does it take to create an enabling environment? And how can education systems, themselves, become flexible, adapting to changing social, cultural, and economic contexts?



Essay 01

An Ancient Education for Modern Democracy and Global Citizenship

George Papandreou

Former Prime Minister of Greece
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In the ancient world, Hermes was god of connection, communication, and movement.

As the messenger among immortals, he could transcend the barriers between Olympus, Earth, and Hades. Always on the move and never settled, he was the deity of travel, crossings, and migration. Voyagers left pledges to him at the side of the road, asking for his good favor. Towns put his image on their gates. He guarded over the boundaries of city-states. God of trade, commerce, and contracts, Hermes was part of each diplomatic negotiation, watching over ambassadors and statesmen as they signed truces and came to agreements.

In the modern world, Hermes' still moves at a dazzling pace. We live in times of increased connectivity and motion. New technologies represent just one instance of his "networking" mindset—a way of thinking that has led to globalization, worldwide economic interdependence, speedy transportation, more efficient energy grids, and unprecedented potential for communication. We are only at the beginning of what the World Economic Forum calls "the Fourth Industrial Revolution." And as author Parag Khanna explains, we are still in "an early phase of reengineering the planet to facilitate surging flows of people, commodities, goods, data, and capital."¹

We stand at a crossroads, ready to start a new journey; but our economic, political, and educational institutions will need to absorb massive changes and adapt quickly if we want our societies to remain cohesive and manageable.

Already, heightened worldwide technological and infrastructural connectivity has brought enormous cultural progress and economic growth. But it has also presented profound challenges. Consider, for example, climate change, cyber-crime, pandemics, inequality, and refugee movements. These civic problems are not isolated in nation-states; their origins and their consequences are globally connected. Likewise, commerce and capital are no longer geographically fixed; seventy-five percent of world trade now happens between countries that don't even border on one

another.

Our challenges are increasingly global and as a result, our local and national political institutions are becoming impotent. They are unable to manage the inevitable process of globalization. And therefore, the δῆμος (demos—as in, the people of a *demo*-cracy) becomes understandably frustrated and angered. Border walls and Brexits should be understood as part of a reactionary desire to disconnect, interrupt, and plug the porous pathways. But isolationists will be disappointed because this new nativism will not restore a sense of democratic control.

A recklessly optimistic acceptance of networked technologies is also not the answer. Popular narratives tell us that democratic solutions lay just beyond the horizon. Supposedly, new technologies will “disrupt” the existing power structures, creating a more “level” and “open” playing field. We’re told that more efficient innovations will democratize social, financial, and political edifices. But so far, the digital revolution only seems to be intensifying concentrations of wealth and influence. In the formative years of this new connected era, “sharing” and “crowdsourcing” business models are fortifying Libertarian monopolies and escalating socio-economic inequalities.

Meanwhile, political discourse seems to be ubiquitous. But it is becoming increasingly clear that today’s social media mostly just offers an outlet through which to let off steam. True influence remains illusory; real online opportunities for people to participate in the development and implementation of concrete policies are rare, if existent at all. Greece has experimented with *wiki-laws*—publishing proposals for new laws and collecting feedback before bringing them to Parliament. But in most cases existing democratic institutions do not, cannot, or perhaps are not willing, to develop the digital tool shed that could enhance or ensure democratic deliberation. And even if they did, we should remember that participatory systems are superfluous without citizens who are prepared to use them.

Many people are not currently prepared to participate in a changing world. They lack not only access, but also the workplace skills and technical know-how. What’s more, few citizens and/or institutions have developed the intellectual frameworks necessary to re-orient themselves. And we all struggle to maintain adequate identity narratives—to voice our unique knowledge, beliefs, and value systems—in a rapid-fire, hyper-linked, and non-linear communications environment.



The result is disempowerment. History makes it clear that when the δῆμος (demos) is not sufficiently educated (often because of inequality, and constraints on their available time for public participation), discourse stumbles and therefore, democracy crumbles. Our collective prosperity, therefore, depends on humanity's ability to prepare a generation of global citizens who have the access, wisdom, and skills needed to work productively, participate democratically, and live contentedly in networked ways.

Of course, this is not simply a technical issue. In fact, it is highly political. It involves preparing youth, not only to be economic resources that can bolster GDPs, but also to be thoughtful citizens who can imagine creative and ethical solutions for the new connected challenges we face. And this requires cultivating identity, a sense of belonging to a global δῆμος (demos). Today's students all need a common base of shared values that can humanize Hermes' global connectivity.

It is useful to remember that democracy only became possible, in the ancient world, when the concept of citizenship shifted from being part of a clan or an ethnicity to sharing common values. The rhetorician, Isocrates (436-338 B.C.), once said that being Greek means to partake in Greek education. And an adequate Greek education, at the time, prepared citizens with the values, intellectual frameworks, and habits-of-mind required to actively participate in the political system that shaped their lives and guaranteed their freedoms.

Freedom was always the foundation of democracy. After all, the ancient Athenians only extended the rights of citizenship to those who were free—not only from slavery, but also free from burdens such as high debt, lack of time, or incapacity to contribute to the economy. Unfortunately, slavery and human trafficking continue today in different forms. However, what has changed is the recognition that servitude and gender exclusion are injustices that must be combatted if democracy and human rights are to be universal. Certainly, we've made great progress, but we've yet to provide all the protection, services, institutions, and education needed to free all the world's people from each and every "burden," and therefore, to elevate them to the status of truly free global citizens.

Additionally, many people resist the concept of global citizenship because it seems to imply the existence a world state—governed democratically, across and beyond borders. Of course, such a state does not exist. And the current struggles within the European Union are evidence

that issues around identity, inclusivity, homeland security, and economic autonomy can make such a prospect extraordinarily complicated. But that should not discourage us. Instead, it suggests that we need to envision new kinds of political “connections,” universal values that can define a humanized globalism and underpin collective citizenship, while also allowing space for maintaining separateness and appreciating difference.

For example, existing technologies could easily enable humanity to offer the first *truly* global citizenship. It could happen in a way that transcends place. For example, global passports might be extended, first, to those who are currently stateless: refugees and migrants. Documents provide legal status, but we all know that papers can easily become stigmatizing unless they are associated with clearly-articulated rights and responsibilities. So, what might such a global citizenship ultimately entail? What awareness and understanding of the world would applicants need to demonstrate? How would they be educated?

If Isocrates was correct, that an ancient Greek was a person with a Greek education, then a global citizen would need to have a global education. Therefore, in accordance with the U.N.’s Sustainable Development Goals (SDG 4 on Education), a global citizen would share common values, endorsing “sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence.”² They should also be equipped with the breadth of skills necessary to make valuable contributions to a global economy. They’d have an awareness and understanding of new tools that shape our world. Plus, agile and critical thinking skills would allow them to assimilate and adapt to change, leveraging the benefits while minimizing the liabilities of technological progress.

Most importantly, however, global citizenship needs to promote the concept of civic participation. Only an active member of the πόλις (polis) can be a good citizen for the κόσμος (cosmos). Therefore, folks must demonstrate a commitment to the rights and responsibilities within their regional, local, and national communities. Taking responsibility for one’s place-of-residence should be the basis of a global citizenship, not the other way around. It’s about more than just being a cosmopolitan elite.

In ancient Greece, Hestia was goddess of home and hearth; she represented “place-of-residence.” Everything that was stable, permanent, and geographically fixed belonged to the goddess. Hestia’s hearth served not only as oven, stove, and heat source at “the center of the domestic sphere,” wrote Jean-Pierre Vernant, the late great scholar of ancient my-



thology. But also, because it is “fixed in the ground, the circular hearth is the naval that ties the house to the earth.”³ Hestia binds people to place. She tethers folks to their homelands.

But oddly, it is Hermes, god of travel and crossings, who gives the home its threshold—his is the image posted on the gates. Why? Because Hermes and Hestia always build boundaries together. So much so that, according to Vernant, the sculptor Pheidias depicted Hermes and Hestia as a couple on the base of the enormous statue of Zeus at Olympia (one of the seven wonders of the ancient world). Their coupling showed citizens that borders are ultimately lines of connection—seams that affix us and thresholds for passage—more than they are marks of division.

Remember that Greece was already a globalized society at the time the statue was built (around 435 B.C.). Certainly, their globe was much smaller than ours, but they were making trade deals with foreigners wherever and whenever they could. Archeologists have found evidence of Mycenaean maritime routes as far west as the Atlantic coast, which means the ancients sailed north around the Iberian Peninsula (Spain). They exchanged wine, olive oil, and pottery for silver and tin from the places that we now call France and Great Britain. They sourced grain, gold, and copper from throughout the Mediterranean, including the Middle East and North Africa (MENA) region. They even imported animal hides, timber, and salt fish from the far reaches of the Black Sea, where Russia is now.

To deal with the anxieties of pre-Hellenic globalism, these ancient people developed a polytheistic religious system. They told stories of *many* powerful gods—interdependent deities with conflicting perspectives. Notice how the ancient mythology mimics the landscape: immortals are like Islands. They are never together, but always connected. The Olympians migrate across a sea of fables, arriving suddenly in a new story with little context or explanation. No wonder: in a culture of connection where new people with confusing values and customs arrive every day, the foundational thought system needs to reflect a spirit of openness and tolerance in the face of disorienting diversity.

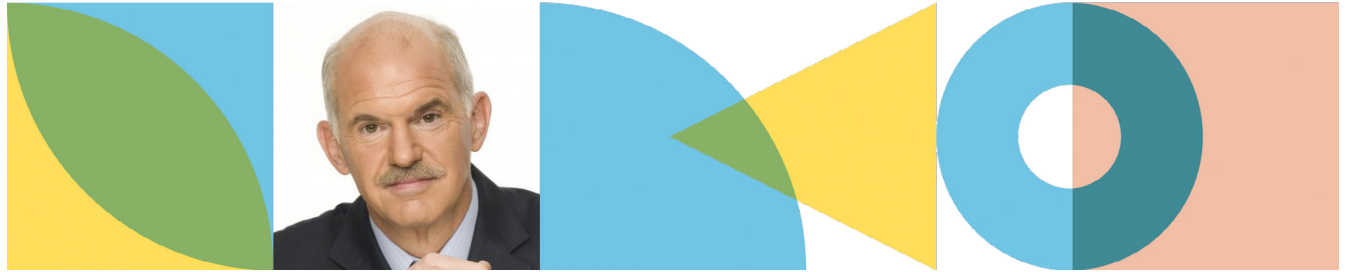
Obviously, modern conflicts can’t be resolved using an ancient doctrine. But we must learn from the past. We can see that an education in global citizenship needs to point toward the underlying truth at the heart of Hermes’ and Hestia’s coupling: there is no escaping a global world, just as there’s no escaping a local one. Union and partition are always in a

reciprocal relationship. Transience and stability are inextricably linked. Together they define what it means to be live in a connected world. Ultimately, an education in global citizenship prepares people to live with these immortal tensions and to devise the institutions that can guarantee human rights and ensure opportunities for democratic participation.



ENDNOTES

- 1 Khanna, Parag. *Connectography: Mapping the Future of Global Civilization*. Random House, 2016.
- 2 UNESCO. "Learning to live together sustainably (SDG4.7): Trends and Progress." <http://en.unesco.org/gced/sdg47progress>.
- 3 Vernant, Jean-Pierre. *Myth and Thought Among the Greeks*. Zone Books, 2006.



George Papandreou

Former Prime Minister of Greece
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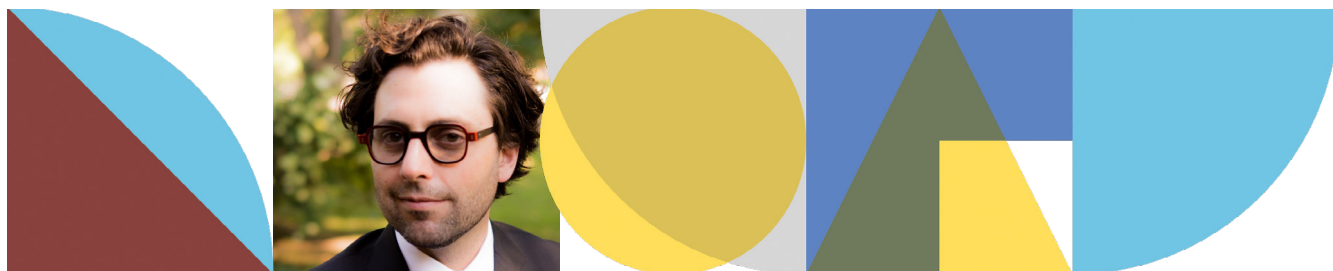
George A. Papandreou graduated from Amherst College and holds an M.Sc. in Sociology and Development from London School of Economics. He was a fellow at Harvard University's Center for International Affairs (1992-1993). An MP since 1981, he served in several government posts, as undersecretary of Culture and Minister of Education, before becoming Foreign Minister from 1999-2004.

Papandreou has received several honors for his commitment to promote peace and democracy, as well as for fighting racism, and notably for his successful campaign, as Foreign Minister, to engineer a rapprochement between Greece and Turkey.

Papandreou is Vice Chairperson of the International Olympic Truce Foundation, an institution he actively promoted when the city of Athens was awarded the 2004 Olympic Games. An active supporter of the information society and e-democracy, in 2003 Papandreou was selected as one of the "25 People Who are Changing the World of Internet Politics".

As President of the Panhellenic Socialist Movement (PASOK) from January 2004 - March 2012, Papandreou launched radical reforms of the Greek party political system. He served as Prime Minister of Greece from October 2009 - November 2011.

Papandreou was unanimously elected as President of the Socialist International in January 2006, a position which he currently holds, as well as being a Member of the Greek Parliament.



Jordan Shapiro

Senior Fellow, Joan Ganz Cooney Center at Sesame Workshop

Jordan Shapiro, PhD is a world-renowned thought-leader on global education. He's currently senior fellow for the Joan Ganz Cooney Center at Sesame Workshop, where he coordinates research and advocacy around digital technology and education policy. His Forbes' column on global education, learning through digital play, kids and culture was read by over 5 million people around the world, resulting in a Twitter following (@jordosh) of more than 115,000. He's an internationally celebrated speaker and consultant whose fresh perspective combines psychology, philosophy, and economics in unexpected ways.

Shapiro is an adviser and strategist to the United States Air Force, helping to shape how they prepare officers with 21st century habits-of-mind and sophisticated critical thinking skills. His forthcoming flagship course, developed for adult learners at Thomas Edison State University, presents the great ideas of the Western academic tradition from the perspective of popular video games. He has served as an expert advisor to the World Economic Forum. And he is also a member of Teach For All's Global Advisory Council.

During the week, you can find him in the classroom at Temple University, where he teaches in the Intellectual Heritage Program and developed the online version of the University's core curriculum.

Jordan lives in Philadelphia with his two sons. His forthcoming book about the future of childhood will be published by Little, Brown & Co. in Fall 2018.

Essay 02

Rediscovering the Cosmopolitan Moral Purpose of Education

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The remarkable global expansion in access to public education which took place over the past seven decades, benefited from a broad consensus regarding its power to advance diverse goals, assuming limited tradeoffs between them.

The idea that everyone should be educated is relatively recent. It is primarily an outgrowth of the Enlightenment and a product of liberal political thought.

The establishment of public education, understood by the founders of the first democratic republics to be essential to the well-functioning of democracy, benefited from global cooperation. For example, on a visit to seek assistance from the British, Simon Bolivar (one of the leaders of Independence in South America) was introduced by Francisco de Miranda, who lived in London, to Joseph Lancaster, the creator of the monitorial system of instruction, which allowed extending education to low-income students. Bolivar would eventually persuade Lancaster to move to Caracas and establish the first teacher training institution. Similarly, Venezuelan born Andres Bello, serving as the first rector of the University of Chile, created a contest inviting faculty to design approaches to educating citizens in the newly independent republic. Argentinean Domingo Faustino Sarmiento, a faculty member at the University of Chile, submitted and won the contest with his thesis 'Popular Education' an approach which drew on his conversations with Horace and Mary Peabody Mann, who led the movement for public education in Massachusetts.

Scientific research and the modern research university are also at heart cosmopolitan enterprises. When some of the signatories of the United States declaration of independence chartered the American Academy of Arts and Sciences in 1780, the oldest scientific academy in the United States, they tasked it not only with the promotion of scientific inquiry to advance the public good, but with the promotion of exchanges among

scientists, no matter their country of residency.

In the modern era, the challenges to liberalism from communism and fascism brought alternative goals for public education, challenging the notion that individuals could be free to choose which education to pursue, and emphasizing political and economic goals, as well as downplaying human rights and modernization goals. Those challenges helped those who valued freedom and equality think with greater moral clarity about the need to align education institutions to the institutions of democracy. The construction of the post-war order which began with the establishment of the United Nations and the approval of the Universal Declaration of Human Rights brought also into focus the moral purpose of educating all persons. Article 26 of the Declaration of Human Rights emphasizes that the point of educating all is to educate them in the rights of every person, and in the institutions which have been created to advance them. The declaration is, therefore, a seminal document in the advancement of global citizenship, and article 26 calls for education for global citizenship, a cause that U.N. institutions have advanced episodically during their history.

POST-WAR CHALLENGES TO PUBLIC EDUCATION

The tensions between the Soviet bloc and the liberal world during the cold war, however, impeded the development of a global consensus with respect to advancing a global citizenship agenda. This is perhaps the reason why the tacit operational education consensus of many of the international development institutions created after World War II evolved into getting all children in schools rather than focus more intentionally on what they should learn in school or how what they should learn should align with a liberal cosmopolitan vision of freedom and equality, as had been intended in the U.N. charter. Consensus on those topics was as difficult to reach in international institutions as it was in societies in which there is much political contestation. This is perhaps the reason the Programme for International Student Assessment (PISA) studies so far have focused on domains such as literacy, mathematics, and science, and not on domains like civics or global citizenship, it is perhaps the reason multilateral and bilateral banks have seldom addressed questions of curriculum content, and seldom funded education operations designed to promote democratization, and the reason organizations like UNESCO have found it difficult to advance human rights education around the



world, even though they were created to do this.¹ It should be noted that the OECD has been working for the last several years in efforts to add a dimension of global competence to the PISA assessments, but reaching consensus among the governments participating in these discussions on the merits and approaches to doing this has proved challenging and it remains to be seen whether the dimensions of global competency which are included in the assessment include civic dimensions or merely dimensions relevant for economic competitiveness. In spite of these challenges, the United Nations institutions made efforts to advance global citizenship, most recently as part of the Sustainable Development Goals agenda which included for the first time in 2016 a focus on educating for global citizenship.

Given the difficulties in reaching explicit consensus on the value of aligning education goals with a liberal cosmopolitan vision of freedom and equality, many nations as well as international organizations focused instead on particular competencies, as goals for the public education system, without attempting an integrated view of how those competencies would align with a democratic vision advancing the values of freedom and equality. Speaking about 'skills for a knowledge economy' was less contentious, in international fora, than speaking about 'skills for a democratic society.'

It is arguably for this reason that the curriculum frameworks in most countries focus on the basic literacies of language, mathematics, and science, but to a significantly lesser extent on civics. Increasingly curriculum frameworks are expanding to include other competencies, not only to other cognitive domains, but to social and emotional domains.² Governments and educators now are also interested in character, self-regulation, self-awareness, grit, tolerance, or leadership. But, for the most part, those interests are not framed as part of a vision of how the integration of those capacities will enable individuals to, individually and collectively, advance social or economic goals. This is a difficult conversation to have in settings where there is no consensus on which place the country should occupy in a global economy, a conversation which will become more difficult as the values of liberalism become more contested.

In spite of these challenges to developing clear and coherent visions on the purposes of public education, however, the dominance of liberalism as the organizing principle of the post war order, particularly given the support of countries with large economies also committed to liberalism, fueled a set of education purposes more or less aligned with the ideals

of freedom and equality, even if those were not spelled out explicitly.

THE RISE OF POPULISM

Such tacit consensus on the reason why nations advance public education and cooperate with others in this enterprise is increasingly challenged by an emerging populist ideology. Populism posits that ordinary people are exploited by elites and challenges the notion of representative democracy with direct action by the masses. Since direct action by large numbers is impractical, too often populism results in autocratic rule by a leader, communicating directly with the masses, unobstructed from intermediary institutions and from the normal division of power and checks and balance of democratic government. Some recent populist leaders include Hugo Chavez, in Venezuela, Evo Morales in Bolivia, Alberto Fujimori in Peru, and more recently Donald Trump in the United States.

Modern populists exploit the following ideas. First, that globalization, and liberal policies, do not benefit all, and that there are important groups of the population who are left behind, and without hope of seeing their conditions improve. They attribute this to elites who are not accountable to those groups, and to a model of development that fails to envision a role for these groups which are left behind. Populists exploit also cultural divides among the population, deep differences in values and worldviews. An array of views held by populists challenge the ideas of a universal project to advance freedom, equality, and human rights, to globalization, and, by implication, to universal public education.

THE EDUCATIONAL IMPLICATIONS OF POPULISM

It is consistent with populist views to advocate more power to local groups to define the goals of education, and less role for government and for inter-governmental institutions. Replacing global and national politics with local politics of course does not mean more consensus, it may mean more conflict, perhaps with less rules of arbitration. The divisions between cosmopolitans and populists exist in local communities. One question is how these differences will be resolved? Will the rule of law and expertise continue to play a role? We should expect less trust in public education institutions, resulting from less trust in governments, in experts and in elites. It is also possible that we will see a renewed em-



phasis on identity politics and culture wars in education.

There are some risks we can expect to emerge from these emerging challenges to the liberal values of freedom and equality as organizing principles of public education.

The first is a risk to the idea of human rights. If nationalism is the new organizing force, the notion of in group and outgroup is defined by citizenship, not by membership in humanity, a challenge to the cosmopolitan foundation of the liberal values of the Enlightenment. Because one of the consequences of globalization has been migration, non-citizens will be the first target for exclusion. If cultural wars define the politics of education we should expect to see an increase in the ongoing battles over the rights of cultural and ethnic minorities, for instance the right to see themselves represented in the curriculum. In the United States, for example, there are individuals and groups lobbying schools for changes in the curriculum which reduce the emphasis on global topics and content. Conservative groups have long engaged in battles over the curriculum and textbooks in schools, these battles have augmented since the last presidential campaign as reported to me by a number of teachers and school leaders working in global citizenship education efforts. In New Jersey, for example, the director of English and social studies of the Rumson Fair-Haven regional high school was recently challenged in a petition organized by a parent to eliminate two books which were used in the history curriculum (Ariel Dorfman's *Death and the Maiden* and Bernard MacLaverty's *Cal*), and to eliminate globally-oriented texts such as Chimimanda Ngozi Adichie's *Americanah*). The efforts to ban books such as these from the curriculum continue by advocates who self-identified as having been mentored by national advocates of similar efforts, such as Dr. Sandra Stotsky, one of the expert witnesses who testified in the court case involving the Mexican American Studies Program in the Tucson Unified School District, whose advocacy has been promoted by the *Breitbart's* website (Jack Shea, personal communication, May 2017).

A second risk concerns global challenges. The prospects for collective action diminish as the world moves towards national populism, and the goals of education move away from preparing students to understand global interconnectedness and globalization.

A third risk is a breakdown of the institutions that were created to protect freedom, democracy, the rule of law, public education, and basic freedoms. This is the risk that populism might evolve into fascism. There

are early warnings in schools of this risk. The sharp increase in intolerance in America has been clearly expressed in and around schools and universities, in the form of more explicit expression of anti-semitism, white supremacy, Islamophobia and hatred towards people of color and immigrants.³

The risk of disorder. Lack of trust in institutions, elites, and governments, will make the challenge of resolving conflict greater.

CAN THE INSTITUTIONS CREATED TO ADVANCE A LIBERAL WORLD ORDER, SAVE IT?

Individuals or institutions interested in a global liberal order should consider a new focus and emphasis on education for democratic citizenship, including global citizenship. This means supporting educators so that schools can advance human rights, educate about shared global challenges, educate for engaged citizenship, focus on dispositions and values as much as skills, and attend to the conditions that make it possible for schools to be effective in achieving these goals. Education was always meant to be cosmopolitan, global education, but this notion was implicit because the expansion of public education was part of a project that was global and widely supported. This project is now contested, and for this reason the ethical foundations of education need to be pursued intentionally, with greater resolve and effectiveness than ever.

Editor's note:

This essay draws from the book by Fernando Reimers "One Student at a Time. Leading the Global Education Movement." Createspace August 2017.



RESOURCES

The book *Empowering Global Citizens*, argues that education should be aligned to help students understand human rights, and to advance them, and offers an ambitious and rigorous curriculum to support global citizenship education from kindergarten to high school.

The book *Empowering Students to Improve the World in Sixty Lessons*, explains why a renewed emphasis on global citizenship is essential in the face of rising populism and hatred. The book offers protocols to help teachers and school leaders develop school wide strategies that support global citizenship education and global citizenship curriculum. It also offers a 60 lesson curriculum from first to twelfth grade.

This article, *Citizenship, Identity and Education* highlights the tensions between educating for work and for civic purposes, and explaining how the acceleration of globalization would increase the tensions between those.

This article, *Education for Improvement, Citizenship in the global public sphere*, is a quick overview of the field of global citizenship education.

The chapter, *Educating for Global Competency*, articulating what competencies and mindsets should be cultivated by global education should cultivate

This article *Bringing Global Education to the Core of the Undergraduate Curriculum* explains how universities could more intentionally educate global citizens.

This chapter, *Educating the Children of the Poor. A Paradoxical Global Movement*, argues that the global expansion of education lost sight of its moral purpose of advancing a liberal order.

This article *Empowering Citizenship for Participatory Citizenship* is an experimental evaluation of a program to cultivate civic efficacy among low income communities in Mexico, an example of the kind of program necessary to advance an education more intentional in terms of its civic purposes.

ENDNOTES

- 1 For example, UNESCO has conducted studies of the way in which textbooks can foster human rights and tolerance among people along various dimensions of diversity, but has been unable to focus attention, at the ministerial meetings they convene every two years for example, on specific cases where governments have used textbooks to develop animus against people from other nations or cases where intolerant groups have influenced the history curriculum.
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Editor's note:

This essay draws from the book by Fernando Reimers "One Student at a Time. Leading the Global Education Movement." Createspace August 2017.



Fernando Reimers

Ford Foundation Professor of the Practice of International Education and Director of the Global Education Innovation Initiative and the International Education Policy Program at the Harvard Graduate School of Education

Fernando Reimers is the Ford Foundation Professor of the Practice of International Education and Director of both the Global Education Innovation Initiative and the International Education Policy Program at the Harvard Graduate School of Education. An expert in the field of Global Education, his research and teaching focus on the relationship between education policy, innovation, leadership, and quality improvement to support children and youth in developing the skills they need to thrive in the 21st century.

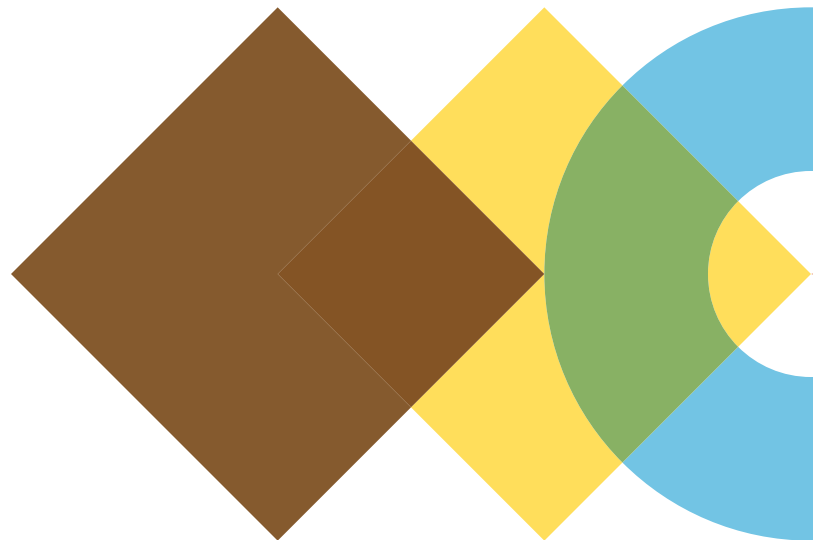
Professor Reimers's writings have conceptualized and defined the profile of a globally competent graduate in the 21st century. His current research focuses on the study of educational policies and programs that develop 21st century competencies in a cross-national study. He has also studied the impact of entrepreneurship education with youth in the Middle East and on the impact of citizenship education programs on youth in Latin America. He is the founding director of the International Education Policy Master's Program at the Harvard Graduate School of Education, a program focused on the development of innovative leaders committed to expanding global educational opportunity. He is a Fellow of the International Academy of Education and works with education policy makers in the United States, Asia, Latin America, and the Middle East. He is also a member of the US Commission for UNESCO and of the Massachusetts State Board of Higher Education and serves on the boards of various educational organizations including Room to Read, Global Cities, and the Latin American Scholarship Program for American Universities.

Essay 03

A Curriculum for Our Time

Seamus Hegarty

Visiting Professor, University of Warwick





Present-day schools are no longer fit for purpose—if we are serious about equipping young people to thrive in an uncertain future.

We need to revisit what “well educated” means in our time and look to what schools are doing in the light of that. A way forward is to determine, by means of public debate, what consensus there might be around the concept of a well-educated person in contemporary society and ensure that schools’ learning offer is well aligned with that.

WHAT IS THE ROLE OF SCHOOLS IN TIMES OF UNCERTAINTY? SHOULD THEY ATTEMPT TO BRIDGE THE SKILLS GAP? CAN THEY DO THAT? SHOULD THEY EVEN TRY?

It is a commonplace that the world is changing and, moreover, that the rate of change is increasing. This is not a matter just for the workplace. Patterns of communication, the construction and distribution of information, political culture and governance, civic engagement, all face major turbulence. It is a brave person who would lay claim to certainty about the future of the labor market or society more broadly. The one certainty is that today’s children will inhabit very different worlds from their parents and grandparents.

If professional pundits cannot predict the future with any certainty, perhaps schools should be let off the hook. Addressing the “skills gap” requires being able to specify what the gap is; building a bridge without having secure foundations at each end is a footless enterprise. There was a time when the skills embodied in, say, shorthand or the use of logarithmic tables were seen as important preparation for the workplace. Who can say which of the many skills currently deemed essential will still be so in twenty years’ time?

If schools do not know what lies down the road, maybe they should concentrate attention on developing each individual's capacity to the full and ensuring they live full lives as children and young people, and focus less on skill acquisition directed at an indeterminate future. Who after all is best placed to thrive in an uncertain world—people who are versed in the narrow set of skills currently prioritized, or fully rounded adults with a broad set of competencies?

WHAT DOES A FULLY ROUNDED/ WELL-EDUCATED PERSON LOOK LIKE?

People are different and have diverse capacities and interests. This will not change and there should be no intention of creating identikit people to a common mold. Is there a case though for a core set of knowledge and competencies that it is worth aspiring to for everybody? Many answers have been offered to this question, from United Nations Educational, Scientific and Cultural Organization's (UNESCO) *The Treasure Within* (to do, to know, to be, and to live together) to the Learning Metric Task Force's *Seven Domains of Learning* (physical well-being, social and emotional, culture and the arts, literacy and communication, learning approaches and cognition, numeracy and mathematics, science and technology).¹

These and similar models imply a notion of the well-educated person which, when elaborated, issues in a school curriculum. What is deemed to constitute a well-educated person has varied over time and place, and it may be timely to revisit the concept in our own time. What does it mean to be an educated person in 2017 (or 2027)? And how would this be determined?

One can imagine engaging civil society in a comprehensive scrutiny of what it means to be an educated person—a *Big Education Debate*, as it were. This Debate would be governed by five principles:

1. Breadth of representation. All sections of society should be involved, not just the traditional education elites. Both traditional and social media should be used to ensure the widest possible participation. It would be especially important to engage young people in the process since it is their future that is at stake. Likewise, every effort should be made to secure inputs from those many people who believe traditional schooling has nothing to offer them.



2. Use of evidence. When empirical claims are being made, the evidentiary basis should be clear. Given that evidence-based claims in education are made with varying degrees of certainty and that worthless claims can gain widespread attention, it might be prudent to establish an independent body to scrutinize claims and determine the authority that can be ascribed to any given claim.

3. Values. A society's vision for education will always incorporate values, and it is essential that these be made explicit during the process. Since there are likely to be differences of view in what constitute core values, these must be discussed in a transparent, respectful way. It is important too that discussion around values and empirical claims are not conflated: values can be contested but empirical claims, if well attested, cannot.

4. Moderation. Procedures for moderating the Debate should be established from the outset and should be transparent to all.

5. Achieving consensus. Full consensus is unlikely to be achieved but there need to be procedures for establishing a workable consensus. This will not be easy but it is an essential part of the process. It may, for instance, entail circulating successive iterations of the positions reached, along with commentary on key points of divergence. There is need also of transparent protocols for achieving closure: some views and cherished positions will need to be set aside in the interests of reaching a common position, and the means by which this is done must be clear to all.

The upshot of this exercise would be a statement of what constitutes an educated person in our time. If this statement emerges from an inclusive, transparent process, one can anticipate that it would have broad support across society and should enable purposeful scrutiny of what goes on in schools.

HOW CAN THE CONCEPT OF AN EDUCATED PERSON GUIDE CURRICULUM SELECTION?

Given some measure of consensus around the core characteristics of an educated person, the task then would be to scrutinize the school curriculum in the light of this consensus and to reform—or create new schools—accordingly.

It is unlikely that what schools currently do and society's expectations about an educated person will be perfectly aligned. Four outcomes can be anticipated. First, there will indeed be aspects of schooling which are conducive to developing well-educated persons—the focus on literacy, for instance, or the importance of structured learning. Other common activities in today's schools may be irrelevant, however; an example might be the memorizing of large bodies of disconnected facts and their subsequent regurgitation in decontextualized examination conditions. Yet other activities may work against the development of well-educated persons; one thinks, for instance, of the focus on individual achievement as opposed to collaborative problem solving or the way in which learning is decontextualized and constrained within the barriers of the traditional school subjects.

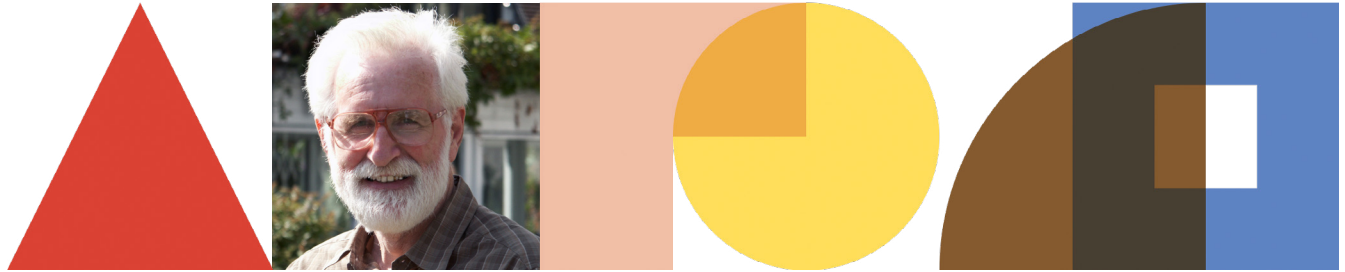
Finally, there may well be significant aspects of personal development that the current school curriculum does not address or neglects to do so in a sustained way for all students. Examples abound, from personal financial literacy, engagement with the arts, media literacy and the capacity to avoid being duped by questionable claims by advertisers and public figures, and so on.

An exercise of this kind would serve as a wake-up call for schools and school systems. There may be aspects of being educated that schools are not well placed to serve—though, given that their primary role is not childminding/containment or the maintenance of social stratification—these should be relatively few. Schools' activities should be targeted rigorously on developing well educated, fully rounded individuals, and any activity that does not serve this goal should be excised. The result would be the emergence of a cohort of dynamic young people who are best placed to meet the challenges of—their—uncertain future.



ENDNOTES

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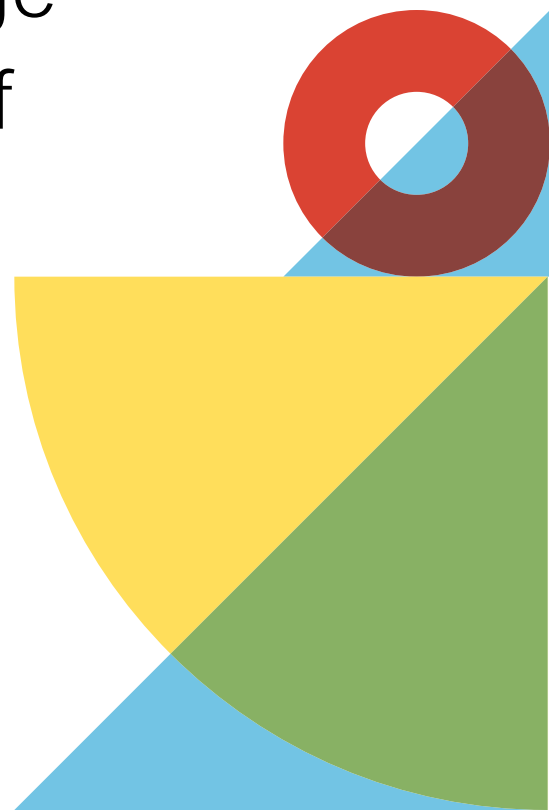
Essay 04

No Parent Left Behind

How Parents Can Change
the Global Landscape of
Education

Claudia Barwell

Director of Learning, Suklaa



When I was 18, I intentionally tried to fail my public exams.

I did so for two reasons. First, it angered me that all my education and learning in a subject could be distilled down to a single grade. It didn't feel representative of the highs and lows of my education.

Second, my parents desperately wanted me to go to university and I desperately didn't want to go. I thought that if I failed my A Levels, they wouldn't have a choice, a university wouldn't accept me, and I could do what I liked. The school was designed to serve the selection needs of universities and was not designed to serve the needs of everyone. I felt it was like a conveyor belt and, at the time, one I was trying to get off.

My parents wanted me to go to university because of their cultural norm. I don't think they had any ambition for me in terms of what I studied, or what I would go on to do. As a parent, if your child made it through school and got accepted into university—job done! They were just doing the same as everyone else.

Now I'm a parent. My daughter is in school and the cultural pressures are on me. Is she doing well enough? Is she being stretched enough? How can we help at home with math as well as reading? What areas are more challenging for her? And, of course, there is no escaping the big one: How does she compare to the other kids in her class? How does she fare in tests?

I want to be able to play an active role in my daughter's learning at school so that I can support her at home. I want to feel like a critical part of her team, but in reality, I often feel intimidated by the school and redundant in her learning journey.

Aged five, my daughter comes home with language I often don't recognize from my own education. Hers is a world of digraphs and descenders, number bonds and chunking, phonemes, and sound mats. Can I



really help if I don't know my Kung Foo Math from my Cuisenaire Rods?

My best example is when her reading journal came home with just the words "Orange Band." I wrote to her teacher complaining that without context—or even a recognizable book scheme—this meant nothing to me and I needed some guidance. The reply from her teacher was clear: "If you don't know what to do, try Googling it." In other words, I really don't have the time to help you as well as the thirty kids in my class. I did Google "Orange Band" and discovered that it was an American pop/punk band from Los Angeles. Not very helpful and nothing to do with primary level literacy.

As parents, if we wish to change the global landscape of education, there are three things I believe to be fundamental: The teacher's relationship with parents, parents' relationship with formal assessment, and the latent power of parents in co-designing schooling.

THE TEACHER'S RELATIONSHIP WITH PARENTS

Teachers have a genuine challenge in relating with parents. Striking the right balance in communication is complex when the parent demographic is so diverse. Schools who play to the lowest common denominator can end up patronizing some parents using a level of language, literacy, and understanding they believe will alienate others. Their ability to differentiate between pupils in the classroom is transferred to their work with parents.

In that context, if you are a "parent", that is often all you are. I know teachers who are also parents who find the rigidity of that relationship particularly challenging. When they are in the role of parent, they cannot be recognized as a fellow teacher too.

Whilst parents are almost universally self-taught, teachers are professionals. Their training covers the range of skills and competencies they need. Some aspects of their role will consistently see them leading, particularly in teaching knowledge. They must be in charge in the classroom and create the right learning environment for their class.

The parent is typically the expert on his or her own child. This expertise can help the teacher become better in their behavior management of

individual children then aggregated to a whole class. This is similar in role modeling, mentoring, and in child protection, other core functions of being a teacher. Many parents are struggling, some may be poorly educated with low aspirations, and a few will be a danger to their children. However, by unbundling what a teacher is, it may be possible to develop a more differentiated relationship with parents.

On this basis, it is possible for teachers and parents to have a valuable exchange and create a relationship of mutual understanding. I think it would be helpful, for example, for teachers to have a report from the parents about the child. This could reflect the child's home life in the same way that a school report reflects a child's school life—with a particular focus on behavior and a child's motivations and passions. As more home-school communication is delivered online, this feels more manageable as real-time reporting.

My child's school uses parent and grandparents' knowledge on an ad hoc basis to support teachers in their instructional role. I recently visited a parent-promoted school in Canada that is active in engaging that resource by design—but this feels unusual. What if each class set aside time to have a workshop run by a volunteer parent? On my street, we have parents who are animators, journalists, politicians, welfare dependents, architects, accountants, builders, theatre technicians, and chefs. They all have expertise to offer. What if this were expected in every school? Busy parents would find the time, even if it was just once, and I believe many would be inspired by the opportunity to do more.

In order to help with formal learning, parents would benefit greatly from an overview of what is being taught during the term or year. Sharing the teachers' planning could include links to brief teaching methods and a glossary of terms so that parents can support learning at home without being told we are “doing it wrong” by our children.

PARENTS AND FORMAL ASSESSMENT

By being more familiar with their child's learning, parents would have a better understanding of how their child is doing. Parents everywhere want reassurance that their child is doing OK, and often are protective of formal testing because it provides objective feedback. But educators who hanker after spending less time and money on testing children could find parents as powerful allies once they have better involved parents in



the learning itself.

When my aunt was fifteen, she came home from school one day and announced that she was dropping three subjects; French, History, and Art. Furthermore, the private school she attended was supporting her decision. My grandfather was furious. In a meeting with the head teacher, it was explained that my aunt would get better exam grades if she dropped these three subjects and concentrated on the others. It was unlikely she would get good grades in French, History, and Art—in fact, she might not even pass. My grandfather was having none of it. He told them: “I’m not paying you to get my daughter to pass exams, I am paying you to educate her and that’s exactly what I wish you to do.”

In this anecdote, I don’t think my grandfather was particularly enlightened or forward thinking, he was using common sense. But it is also a reflection of a school culture in which the outcome that matters, above all else, is test scores. This has worsened as exam results are now widely used for school accountability.

I know firsthand from teachers that they often have a clear choice between educating children or teaching them to pass tests. They do not have the freedom nor time to do both. Either learn to speak French so that you can hold a conversation, or get a good grade on the exam. In English, just study the chapter and the themes for the test, or read the whole book and discover a passion for reading.

The irony is that the currency of these tests for getting a job is diminishing. More employers from Google to the U.K. Civil Service are screening for demonstrable skills over qualifications as a proxy for skill. A friend of mine, who works as head of corporate PR for a FTSE 100 company, says that when they recruit they have no interest in qualifications, only experience. You need education to be able to put together a quality CV and cover letter (she throws anything with grammatical or spelling errors straight in the reject pile), but the English grades themselves are not important. You need to do the work, but you do not need to ace the test.

Every parent’s paradox is that they know that good grades only reflect a component of success at school, yet all they need to value is what is easily measurable. Ken Robinson’s “creativity,” Angela Duckworth’s “grit,” and Sugata Mitra’s “curiosity” all resonate and we know they matter. These are things I believe to be at the core of a great education, but I don’t believe we should be finding ways to measure them.

PARENTS' ROLE IN CO-DESIGNING SCHOOLING

I want my child to be continually developing as a person. That is my responsibility as a parent, but I need help from the school. Together we can deliver that: I can support teachers in knowledge development and use the school's help in developing my child's character and other areas of personal development.

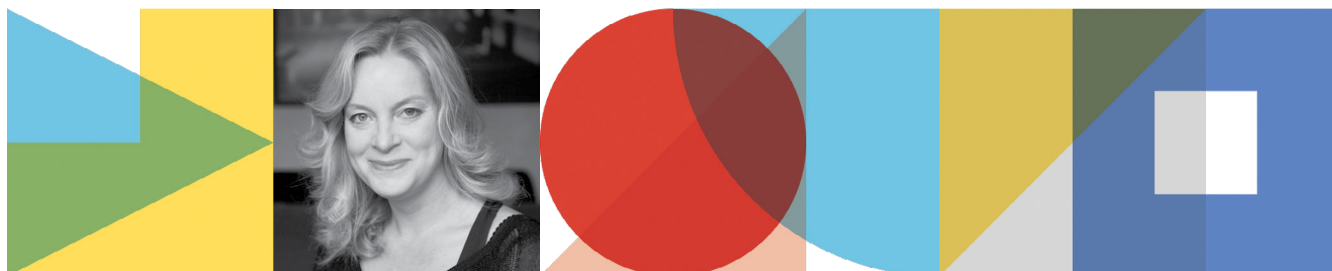
This vision of co-produced schooling needs a paradigm shift. It needs a co-designed service. What would this look like? Starting at school level, let us survey parents and ask some key questions.

What values do you believe are essential for a developing child?
What part of the current curriculum is essential?
What should we be teaching that we are not?
What skills will they need for the future?
What role would you like to play in the education of your children?"

These are loose examples, but asking these questions at scale would begin a relationship of utilizing parents as a resource. Include them in the design of education and then consider the skills and talents available to support the delivery. This progresses parents from a latent to an active resource.

The resulting prize is a school that keeps dynamically re-aligning itself to the evolving values and views of the parent body. The teachers have allies at home who can help with their range of responsibilities, and an understanding of the individual children and how better to support them. The parent body becomes a group supporting each other, supporting teachers, and better supporting their children.

As an 18-year-old, I failed in failing my public exams and I did get a degree after all. I am not a teacher, but I am an education professional. In my work, I bring together educators, policymakers, academics, and education business leaders to exchange ideas about school reform. I attend countless events that do the same. At the best events, we listen to students. But in all of these conversations, parents are never included. We even leave our own experience as parents outside the discussion. No one has a more invested interest in the future of education than parents do. Just imagine the potential we could unlock.



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Claudia is the director of learning at Suklaa (suklaa.org) and the co-founder of Oppi Festival (oppipenice.com). Suklaa deliver international conferences, whole school training, team building and education consultancy, often around design thinking or change management. Oppi is a not for profit education festival intent on building a meaningful global network of talent and expertise to consider how we can solve some of the challenges facing education across the world.

Essay 05

What is the Role of Teachers in Preparing Future Generations?

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In September 2015, the U.N. General Assembly approved the Sustainable Development Goals that included one all-encompassing goal on education, SDG-4, which demands primary and secondary inclusive quality education for all by 2030.

This is a very ambitious goal. In many parts of the developing world, too many are left behind by not having access to school or learning the basics. Of the 121 million out-of-school children and adolescents in low- and middle-income countries, one-sixth of children did not complete primary school and one-third of adolescents did not complete lower secondary. Thirty percent of countries still do not have gender parity in primary and 50 percent do not have it in secondary.

Worst of all, 250 million children cannot read, write, or do basic arithmetic, although many of them have been in school for some years. “Schooling Ain’t Learning” states the subtitle of the excellent book from Lant Pritchett, “The Rebirth of Education,” which analyzes the challenges the developing world faces to ensure improvements in literacy and numeracy.¹ The United Nations Educational, Scientific and Cultural Organization (UNESCO) has described it as the Global Learning Crisis.²

To make matters worse, the demand for skills is migrating to non-routine cognitive and interpersonal skills, since many jobs are being lost to automation.³ Curricula in schools do not normally consider this change and education systems do not have the tools to address these more sophisticated skills.

Globalization has made these changes present in almost every country, adding to existing inequalities and contributing to the intergenerational transmission of poverty. In many low-income, and even middle-income countries, certified teachers (i.e. teachers who have received the formal education required by the country’s regulations) lack knowledge in some

subjects such as mathematics, physics, and chemistry, lack adequate quantities of textbooks, and connectivity (and sometimes even electricity) is rare in school buildings. Yet, even in these cases, the demand for higher-level thinking skills is present in the labor market, imposing a double-challenge over an already overburdened school system. In this context, what should be the role of the teacher? It would be easy to respond that if the basics do not exist, we should not expect anything more than the basics, thus allowing the next generation of students to be unskilled and unprepared for the future ahead.

In this short essay, I try to state the opposite: It is possible, with the appropriate support, to expect teachers to help students to be active citizens and professionals in these times of uncertainty.

THE PATH TO SCALE 21ST CENTURY EDUCATION IN COUNTRIES WITH STRUGGLING EDUCATION ECOSYSTEMS

These countries cannot make their school systems progress step-by-step, first covering the last mile in access, then promoting the outdated model of quality education for all, and finally ensuring that the system incorporates the development of a new set of skills. They will have to leapfrog and learn from countries that have previously improved their education systems.

For this to be feasible, some initial deficiencies will need to be addressed, such as a precarious pre-service and in-service education and inefficient teachers' hiring processes. Pre-service education in the developing world tends to overemphasize the theory, at the expense of the practice of education. A curriculum reform in the tertiary institutions that prepare future teachers would be more than welcome. Only through a solid reflection on a teacher's everyday practice could we advance towards a model where they could be seen less as a mere class provider and more as a mediator in the process of skills development—literacy and numeracy, higher order cognitive skills, or social and emotional skills. These skills are better developed through interactions, not speeches or copying from a blackboard, as most teachers do. Facilitating a class where consistent participation is expected is extremely difficult for novice teachers that were themselves taught through pedagogies that don't demand students' engagement.



Last year, the OECD delivered an interesting report on the strategies mathematics teachers from participating countries in PISA 2012 used to deliver their instruction.⁴ The report grouped the strategies into three categories: active learning, where the emphasis is on promoting student engagement in their own learning, with support of ICT and lots of team-work; cognitive activation, where students are challenged into a process that develops higher order thinking skills, especially problem solving and critical thinking; and teacher-directed instruction, that relies on the teacher ability to deliver good classes. According to the report, the strategies are not mutually exclusive, which demand the instructor a constant change in roles, to adjust to the kind of instruction being implemented.

Pre-service education and hiring processes in the developing world should prepare professionals that are ready to manage these more sophisticated roles as they deal with their daily teaching of classes.

In addition to this important transformation, professional development should incorporate the notion that, in addition to being a mediator, a teacher is part of a team and teaching is not an isolated work. Teachers need to learn to collaborate, co-create, plan classes, and monitor their work together. This could be in the school they are working or within a school system. Good initiatives of pairing struggling schools with better performing ones in the same area—thus dealing with the same student population—have shown promising results globally.

The real challenge is that before the profession becomes more attractive, and the pre-service education more effective, these countries need to deal with a current cohort of teachers that often lack the skills and repertoire to face this complex reality. In these cases, a blend of more scripted teaching strategies with space for experimentation and support for innovation have shown to be effective. Studies have shown that unskilled teachers benefit greatly from additional support such as pre-formatted class plans, digital classes, and more detailed textbooks.⁵

Despite this, learning—through collaboration or professional development courses—how to deliver classes that are more engaging and allow for the student's space to develop higher order thinking skills, is feasible even under these difficult circumstances. It just demands more structured professional development and better-prepared instructors to address these teachers' needs.

This demands mentoring and class observations, together with structured

materials to support initial efforts from the novice teacher to prepare meaningful class-plans and deliver them. It also requires some additional time if the classes are—as in some developing countries—too short or based on a curriculum overloaded with unnecessary content.

BUILDING GLOBAL CITIZENS AT UNCERTAIN TIMES

The demands put on schools are not restricted to preparing students for the increasing demands of the labor market. A child needs to grow to be an informed member of the society in which they live and to have the knowledge and capabilities to participate. In addition to acquiring basic cognitive and social and emotional skills, a solid Global Citizenship curriculum should be introduced in the school system even in the developing world.⁶ Understanding how his or her own country is organized, and how it connects to a globalized world, will be of great value for the student. To foster the skills needed to become a global citizen, we should develop these skills in a structured way in the teachers' workforce. This means in-service education through collaboration and group-discussions on empathy, cultural appreciation, ethnic and gender identities, and general knowledge of current world affairs and challenges. A teacher that believes she is part of humanity and not just of a region or a country tends to foster the same perception in her students.

Ultimately, if we want students to become citizens, we need to give them a voice. Very often, in school systems, we treat teenagers as children and don't trust them to be responsible for their own student lives and choices. This means we must trust them to take part in important decisions about the school curriculum and we must discuss their behavior issues with them directly—not their parents. This would also require allowing some space for them to make mistakes and learning to correct them effectively. A global citizen, it must be understood, is first a citizen in his own school, community, and country. If we truly want to prepare them to become informed and active members in their countries, it is important to give them some space to exercise choices and activism at an early stage.

In Rio de Janeiro, where I was municipal secretary of education, we introduced a mandatory assignment at the beginning of 7th grade, for the adolescents to state in a structured way the life project—that meant putting their dreams into words and learning to plan their future lives. They did it at the beginning of the school year, in an activity conducted



with the support of 9th graders that were trained specifically for the task. Only after the whole class arrived at an acceptable proposition for each kid did the teachers enter the classroom, at which point each student could choose a mentor teacher to continue discussing their projects. The results were impressive for both students and instructors.

USING TECHNOLOGY TO LEAPFROG

Although it might seem utopic, education in low- and middle-income countries can benefit from modern technology even when the basics are lacking, if a more contextualized approach to including such tools in the classroom is taken, as a support to teachers not as an additional subject.

In China, for example, the Ministry of Education offers schools options to use digital classes. In Rio de Janeiro, when I was secretary, we took a similar approach: offering all teachers the use of digital classes prepared by trained instructors. The use of the platform has shown positive impacts on learning. Yet to take full advantage of this tool, connectivity needs to exist. In the absence of this, pen-drives or offline options were provided. Using technology for remedial education was and is still done, even when connectivity is not available.

Other possibilities are the broadcasting of classes to support instruction where specific teachers are not available. An interesting example of this innovative practice was highlighted in the Millions Learning report from the Center for Universal Education at Brookings.⁷ The school system in the state of Amazonas in Brazil had the challenge of providing physics and chemistry classes in the Amazon jungle for high school students. The solution was to enlist a teacher to broadcast classes and provide schools with a generalist teacher to ensure class participation and student engagement.

The use of technology in these examples show the possible advantages of bringing resources and a knowledge base that is not yet available in every classroom. On the other hand, the fact that in the education ecosystem it exists somewhere and may be mobilized is of great help and doesn't give teachers the sense of disempowerment, since it is prepared by teachers from within the Amazonas system or by members of the community and not by a distant company located in another country.

CONCLUSIONS

The SDG-4 demands an organized effort to ensure that every child and adolescent in the world has the means to complete quality primary and secondary school, as well as develop skills to live a healthy and productive life. Unfortunately, as uncertainty grows, this task seems almost impossible—even in high-income countries—as more complex skills are demanded by employers and globalization requiring individuals who understand the challenges the planet is facing and that can operate in different geographies.

What should be the role of teachers, in such an environment, especially in low- and middle-income countries? This is the question I have tried to answer here, providing some clues of what could be done to ensure that the United Nation's goal can actually produce a more educated global society, and that a better world might emerge.



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Claudia Costin

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Claudia Costin, a Brazilian national, was the Senior Director for Education at the World Bank between July 2014 and June 2016. She currently leads the Innovation and Excellence in Education Policies Center in the prestigious Getulio Vargas Foundation in Brazil. Before joining the World Bank Group, she was Secretary of Education, Rio de Janeiro. Under her stewardship, learning results rose by 22 percent in the city. She also implemented a strong Early Childhood program, working seamlessly across sectors with the Health and Social Protection secretariats.

Ms. Costin has been Vice President of the Victor Civita Foundation, dedicated to raising public education quality. Believing in the transformational power of education, she helped create the civil society movement Todos pela Educação, also serving on its technical committee. Convinced that teacher motivation is critical for real learning, Ms. Costin communicates with thousands of teachers using social media.

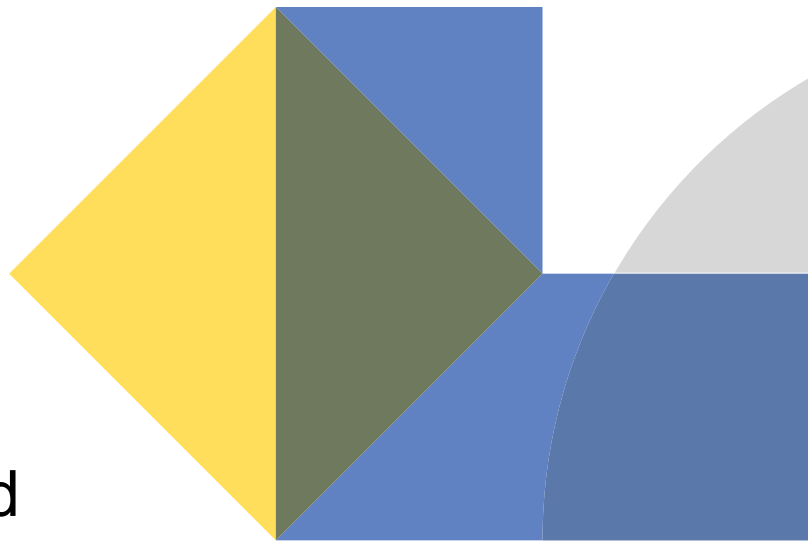
Ms. Costin has held academic positions at the Catholic University of São Paulo, Getúlio Vargas Foundation, INSPER Institute of Education and Research, Harvard Graduate School of Education and École Nationale d'Administration Publique in Québec. She has a Master's in Economics from the Escola de Administração de Empresas de São Paulo of the Fundação Getúlio Vargas.

Essay 06

Changemaking and Engagement in an Uncertain World

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Changemaking in education is a risky business.

Think of all the pressure that might tempt a teacher to leave “well enough” alone—to keep doing exactly what has always been done. New approaches take time to perfect and failed experiments can set students back. There is often a tremendous mismatch between initiatives handed down from a district or school administration and what teachers actually do, or want to do, in their classrooms. Parental and public opinion continuously shape the work of schools and districts. Policy at every level of government adds a different set of pressures as it veers and shifts with the political winds, blowing from the north, then south, then east, and north again.

But “well enough” has never been good enough. With the rapid and dramatic shifts of the past decades—the transition from an industrial- to an information-based economy and the constant reinvention of systems that require a nimble mind and responsive intellect—“well enough” becomes a weight we hang from the necks of our students, holding them back.

When students leave school, they enter an economy that is radically different from the economy of past decades and from the economy we will see in the near future. It is estimated that *65 percent* of the jobs of 2050 do not exist today.¹ These are difficult odds for students who are coming through a system that doesn’t adequately prepare them to be flexible problem-solvers and creative thinkers.

SHIFTING THE EDUCATION LANDSCAPE

One of the key strategies trying to radically shift the education landscape is leapfrogging—where linear, incremental change is sidestepped through out-of-the-box, bold approaches. One of the prerequisites to leapfrogging in education is the rejection of the illusion that we know what today’s children will need to know in 50 years. Instead, we need to teach students *how to teach themselves*. We need to tap into their innate curiosity, teach them to think critically about everything they encounter



(including the words of their teachers), help them learn to communicate and collaborate, and let them have a say in what happens in the classroom.

This is what we are doing at Center for Inspired Teaching. We are changemaking. We are experimenting. We are perfecting a pedagogy that leaves 20th century compliance-based education behind, and engages students 100 percent, intellectually, emotionally, and physically. A compliance-based classroom should be familiar. Classrooms where students practice rote memorization, rather than engaging in deep thinking. Classrooms where teachers create rigid protocols, rather than encouraging students' curiosity to drive the activities. Classrooms that are solidly teacher-centered and entirely teacher-directed, rather than student-centered and student-directed. Not all compliance-based classrooms look the same but they all lead in the same direction: towards the internalization and replication of the teacher's thinking, beliefs, and behaviors.

Engagement-based education is different. Rather than telling students *what* to think, Inspired Teachers teach them how to think for themselves. Engaged students learn to solve novel problems through creativity and collaboration. As often as possible, their work is relevant to their real lives. In an engaged classroom, students don't have to be told why what they learn is important—they can see it for themselves.

DOUBLING DOWN ON TRADITION

In recent years, the fixation on measuring academic improvement through standardized test scores has resulted in many schools and policy makers doubling down on tradition, leaning heavily on compliance. We have seen the spread of rigorous curricula enforced through state and national mandates. Joan Goodman, Professor, University of Pennsylvania uses the term “regulated environment” to refer to schools characterized by an insistence on “compliance to pervasive rules that shadow children throughout the day;” rules that cover everything from what to wear to how to walk to how to ask permission to use the restroom. Goodman also points out that these types of schools have proliferated in recent years in the United States, particularly in low-income, urban areas.² Compliance is as rampant as it has ever been.

Supporters of this kind of schooling might argue that engagement is

present in highly-structured, pseudo-militaristic schools, which are far more prevalent in low-income communities and communities of color. Kids might have good attendance, might answer questions in class, do their work, respond positively to their teachers, and be adept at “doing school.” But this does not constitute true engagement. Instead, it is simply behavioral engagement, and it is only skin-deep. In a classroom based on behavioral engagement, even when students complete their tasks efficiently and seem to be following the classroom rules and paying attention, they are often motivated by external rewards or teacher demands, rather than curiosity or a love for learning. They have learned to function well within a system that asks little of them beyond compliance. True classroom engagement requires that students also be emotionally, intellectually, and physically engaged in their learning.

Think for a moment back to your days in school. I’m sure all of us can remember spending plenty of time sitting still at a desk, listening to a teacher, and taking copious notes. Perhaps you learned the facts taught, some for a little while and fewer for good. You may have even remembered most of what you needed on test day. If you were a good rule-follower, you probably paid attention (even when it was boring). But were you engaged? Did you care about what you were learning? Did you see how what you were learning related or mattered to your life? Or, like most students in compliance-based classrooms, were you just listening, memorizing, and reciting information because you knew you were supposed to—because you were ultimately answering to outside pressures (parents, college goals, “the future,” fear of punishment) rather than the innate call of your own passion for learning, and your growing understanding of the deep value of a good education?

Compliance-based classrooms, in their outdated thinking and focus on surface-level good behavior, breed disengagement. Recent studies indicate disengagement is an epidemic in American schools.³ The 2016 Gallup Student poll found that less than half of students said they were engaged in school. Almost one-quarter of these students reported that they were *actively* disengaged.

This is a critical issue because student engagement is tied to a myriad of positive life outcomes. Actively engaged students earn higher grades and have lower dropout rates.⁴ In addition, engagement is correlated with positive social outcomes outside of the classroom; for example, positive emotions and persistence through challenging situations.⁵ Conversely, disengagement is correlated with decreasing student achievement, and



can lead to students dropping out of school entirely.⁶

Compliance-based teachers are satisfied when students say what the teachers want to hear, and when they behave and think in predictable and familiar ways. *True* student engagement, though, is much more difficult to create and much more difficult to measure. But it is what our schools desperately need.

THREE ELEMENTS OF ENGAGEMENT

Inspired Teachers focus on bringing three distinct elements of engagement to every part of their teaching. There is intellectual engagement—the ability to identify and build connections between classroom content and a student’s everyday life. There is emotional engagement—the sense of belonging in the classroom and school. Finally, there is physical engagement, which involves bringing the whole body into the learning experience; it means—to steal an image from Sir Ken Robinson—treating the body as more than just a vehicle for carrying a student’s head around.

Students engage intellectually when they see the relevance of what they learn in their everyday lives.⁷ This happens when teachers craft lessons that are responsive to their students’ interests and experiences. Instructional activities such as using authentic learning, allowing students to set their own learning agendas, focusing on creativity and collaboration in the classroom, and using small group work and discussion instead of lectures, have been found to lead to increased student achievement.⁸ Like emotional engagement, intellectual engagement has effects outside of the classroom—it promotes both motivation and self-regulation.⁹

Emotionally engaged students feel a sense of belonging in the classroom. Emotional engagement comes from learning that addresses a student’s individual needs, and from a mutually respectful atmosphere between students and teachers. Studies show that when students identify themselves as members of a school community, it deepens their commitment to their education.¹⁰

As for physical engagement, it’s not as easy as giving students recess. When done correctly, movement becomes meaningful and students learn communication, teamwork, risk-taking, accountability, and how to exchange positive feedback with one another.¹¹ In a compliance-based

classroom, movement is unusual. But this is a serious mistake. For example, one study of elementary students found that integrating dance and math classes had a significant effect on students' positive attitudes and engagement towards math. The students were also better able to make connections across subjects, which made learning math more applicable to their lives.¹²

DEVELOPING CHANGEMAKERS

For a teacher, transitioning from a compliance-based pedagogy to an engagement-based pedagogy is not easy. It takes time, thought, and effort. More than that, though, it means taking a risk. Lesson plans often require mid-class improvisation. Teachers cannot simply hand students a worksheet and take a breather. Discipline is not as simple as sending a student to the principal or suspending him from school. This becomes all the more difficult with the number of stakeholders a teacher has to manage—those outside winds blowing. But to be an Inspired Teacher you must be a changemaker, willing to throw wide your classroom door and share your great ideas with your colleagues and community. In short, you must be brave.

At Inspired Teaching, we teach teachers in the same way we expect them to teach students. We engage them 100 percent intellectually, emotionally, and physically. This is done intentionally for many reasons, and in no small part because we know that learners big and small don't learn in radically different ways. We want our teachers to develop students who are changemakers—in their classrooms, schools, communities, and the world. And so, we have to develop in teachers the same commitment to changemaking, which starts with a deep commitment to the mindset of engagement-based teaching and learning, and progresses to an increasing facility with the methods of engagement-based teaching and learning.

When you walk into the classroom of an Inspired Teacher, you may not spot her at first. She may be on the rug with a student, or lost in a group project. But her presence in the classroom, the school, the community, and the world is felt—because she teaches from a place of confidence and pride, and because she is not afraid to take risks herself so that she can teach her students to take risks as well, all in service of creating change that is felt both near and far.



The challenge we face in education is how to create an environment that lets change happen, that lets the changemakers shine, and that rewards courage and risk. As leaders in our fields, it is incumbent upon us to be comfortable with moving away from old systems, it is incumbent upon us to showcase and honor the educators who are bringing engagement-based teaching and learning to their classrooms and schools and communities—especially underserved communities where engagement is lacking. It is incumbent upon us to, at the very least, leave our next generations with the tools they'll need to address global challenges such as climate change, increasing wealth inequity, an aging world population, and more (we'd be especially smart to equip today's students with the skills they'll need to take care of us as we age!).¹³ Because without changemaking, and without a significant investment in a future-friendly pedagogy of engagement, our children will be unprepared for the future they are facing, unprepared to solve the significant challenges we are leaving them, and unprepared to create a better, more equal, more just, world.

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Essay 07

To Close the SKILLS Gap, Start with the LEARNING Gap

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The emerging jobs of today, tomorrow, and the future we cannot foresee will require the skills and capabilities that make us most human.

Take the common assumption about the kinds of skills that are least likely to be automated: Most believe that higher-order skills, requiring complex intellectual processing and extensive training, are least likely to be automated. To demonstrate the weakness in this assumption, let us consider two highly different jobs: Expert Radiologist and Construction Worker.

The Expert Radiologist undergoes a long journey of schooling, internship, residency, and often, a post-graduate fellowship in a subspecialty of radiology. The Construction Worker requires little-to-no formal education. However, radiology is already subject to far greater automation than construction, due to its primary reliance on analyzing and evaluating visual images and patterns; tasks completely performed by computers. In fact, robots programmed to assess medical scans out-performed expert human radiologists in a controlled setting.¹ How can this be?

Unlike the core work of a radiologist, which is highly predictable and often routine, the Construction Worker acts in an unpredictable physical environment, requiring human assessment and judgment, and physical navigation—activities inextricably linked to being human. It is primarily the routine nature of job activities and the predictability of the physical environment in which tasks are performed that predict a job's automation potential.² The possibility that automation could replace one-third to one-half of today's jobs as soon as 2020 is not new. What is much less known is that nearly half of all job activities performed across jobs, and at least 30 percent of activities in 60 percent of all occupations, could be automated. This is why understanding the specific activities associated with jobs can provide more detail on the future of work, and therefore, on the future of learning.

While we face the certainty of many activities integral to today's workforce becoming automated in the future and the fear of disappearing

jobs, we hear the loud voice of employers affirming that already today there aren't enough skilled workers to meet employers' needs globally. Interestingly, there is overwhelming unity around the kinds of skills most needed, and they aren't only traditional vocational skills, but competencies in activities supporting collaboration, communication, and mental agility.^{3,4,5} The kinds of activities least likely to be automated happen to be the same activities facing talent deficits! This could be seen as great news if we are prepared to close this gap.

Yet we have much to do to close this gap. On the positive side, global education reform efforts over the past decade are doing more to foster whole child and youth development, in order to strengthen core values and capabilities for life. On the negative side, education policy and practice reform aren't yet aligned to the activity gaps described above, and employers are relatively absent from education policy reform.⁶ Therefore, it is urgent and critical that efforts to reform and innovate education are linked to and aligned with workforce gaps and employer needs.

REFRAMING THE PROBLEM TO DESIGN THE SOLUTION

If breaking occupations down into their component activities can improve our understanding of workforce needs and heighten our awareness of what activities are needed to perform certain functions particularly well, could applying that kind of thinking to education reform help to improve learning outcomes? If we reframe the problem from a *Skills Gap* issue (usually linked to vocational skills training) to a *Learning Gap* issue (linked to strengthened competences for cognitive and socio-emotional learning that are fundamental to the skills gaps defined by employers), can we simultaneously strengthen life and livelihood trajectories? By reframing the problem as one largely stemming from a gap in learning, we aim to link education and employment by distributing ownership of, and leadership for, the solution across the education and employment sectors.

Momentum for addressing the Learning Gap is swelling: The U.N.'s Sustainable Development Goals highlight quality education and relevant skills for global youth and adults as major vehicles for strengthening economies and reducing poverty. They provide a blueprint for the education of the future—focused on responsibility, resilience, connection and creativity—and what the Brookings Institution rightly calls “*breadth of skills*.”⁷ While the goals underscore the need for cognitive competencies (litera-



cy, mathematics, science) they also reinforce the socio-emotional skills needed to succeed at the cognitive acquisition communication, critical thinking, problem solving, creativity, management of one's emotions. In addition, they reference life-long learning, starting with early year education through adulthood, and includes such themes as good citizenship, participation, sustainable development, and entrepreneurship.

There are three actions that employers, educators, and related stakeholders can do to close these gaps:

1. Align Workforce Needs to Education Reform, Keeping in Mind that Employers Seek “Whole Persons”

Policy reforms for education are rarely linked to those of the workforce, though they often have impact on one another. Furthermore, at the national level, surveying of employer-assessed gaps rarely feed into formal system-level education reform or drive curricula in informal settings. Employer engagement is good business: Having under-educated employees hurts firms' productivity.⁸

Creating a place for employers at the education reform table and vice versa can foster greater dialogue and influence in both directions. From employers to educators: Feedback on the kinds of activities required for employment success. From educators to employers: Feedback on how employers can move beyond traditional candidate and employee evaluation to better assess (and value) a breadth of skills targeted by innovations in pedagogies and curricula.

2. Adopt Whole-Child Approaches in Education and Teach Core Competencies

Numerous surveys of employers worldwide have identified common areas of core competence for the 21st century: *Critical thinking and problem solving*, based on asking the right questions; *collaboration and influence*, especially with one's peers and within diverse groups working across national borders on globally relevant problems; *mental agility* to adjust for changes and unknowns and to upskill quickly and as needed for one's career; *entrepreneurship* to identify and act on new ideas; *effective communication*; the ability to *access and analyze information*; and *curiosity*. Young people need to have a good grasp of their chosen content area, but they need broadly transferable skills that are often positioned and nurtured in the humanities.

These core competencies often overlap with needs for social and emotional learning (SEL). SEL enhances the capacity of young people to assimilate attitudes, skills, and behaviors to deal effectively with what they encounter in school and daily life, and include intrapersonal, interpersonal, and cognitive competencies.^{9,10,11,12} Categories of SEL skills include: Self-awareness, social awareness, self-management, relationship skills, and responsible decision-making. This is the foundation on which cognitive learning rests—a child cannot focus on the difficult tasks of learning to read and doing complex mathematics if they cannot manage their emotions or work within a team to investigate and propose a solution to a scientific study. Reinventing education systems around integrated, whole-person frameworks support families and children to be successful in education, work, and life, and mitigate the adversities that children often face, and can prevent success.

3. Close Learning Gaps for Teachers & School Leaders

We often overlook the criticality of teachers or principals in embodying changes we hope to achieve in and through learning. It is easy to understand why teacher training programs or classroom material cannot alone achieve profound transformation. When the teacher or principal has firsthand experience, and has directly benefitted from a truly holistic learning environment, she is an authentic role model and change champion. In addition, for experiential learning to be grasped, students need an empowered and skilled guide for the methodology, meaning that teachers and other educational leaders must integrate the importance of active learning and be able to demonstrate it from a place of firm belief in its value.

Given that schools are never separated from the community where they are located, teachers and principals who model active learning are not just educational leaders, they are leaders capable of transforming whole, interconnected communities by working collaboratively to dig up the roots of entrenched social problems that ricochet into education. Greater, looping partnerships are needed between teacher training institutions, schools, and researchers who generate evidence on what works (and what doesn't) to continue feeding the field of education with its accountability needs. Teachers would also benefit from hearing feedback from employers. This collaborative approach not only supports accountability from all parties, and supports adults' own development of critical competencies, but it seamlessly models expectations for students' progress,



behavior, and interaction by all who are responsible for their growth and development.

4. Invest in ECD – A Moral Imperative to Learn Early, and Learn Well

Early childhood hosts an extremely robust development of values, character, and a particularly important set of skills known as “executive functioning”—include working memory (hold, manipulate, and connect information over short periods), inhibitory control (mastery over impulses, resisting temptations, pausing and thinking before acting) and mental flexibility (the ability to adjust to changed demands, priorities, and perspectives, and to understand someone else’s point of view). *Executive skills in pre-school are more predictive of life outcomes than academic skills at that age.*¹³

Furthermore, quality early childhood care and learning can offset the lottery of birth. Children who are born facing the greatest, most extreme adversities—including poverty, violence, displacement, severe abuse, neglect, and marginalization—can develop resilience to mitigate their circumstances and to participate in the common good.^{14,15} Facing adversity positively (i.e. being able to thrive despite challenges) will only help children who face an unknown future. If the majority of the jobs needed by today’s teenagers remain a great unknown, what about the future facing today’s two-year-olds?

Creativity and improvisation, flexibility in thought and action, critical thinking and analysis, impulse control, the ability to interface with a diverse array of humans and robots are distinctively human. While it is unlikely that entire jobs will be replaced, what is most at risk is a great majority of the tasks within jobs. Those tasks that will remain will be more rewarding, but require an ability to learn fast, learn often, and connect with fellow humans, artificial intelligence, and technology in unprecedented ways. We would do well to strongly align workforce needs, which include thoughtful, active, and compassionate citizens, to education reform and learning outcomes.

Editor's note: Dr. Randa Grob-Zakhary is the Global Head of Education at Porticus and Jessica Hjarrand is Global Programme Manager, Education at Porticus. Porticus provides financial support to the Center for Universal Education.

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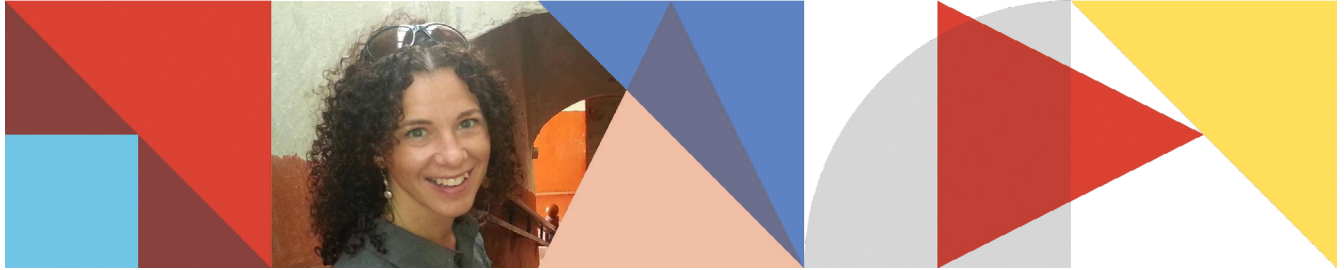
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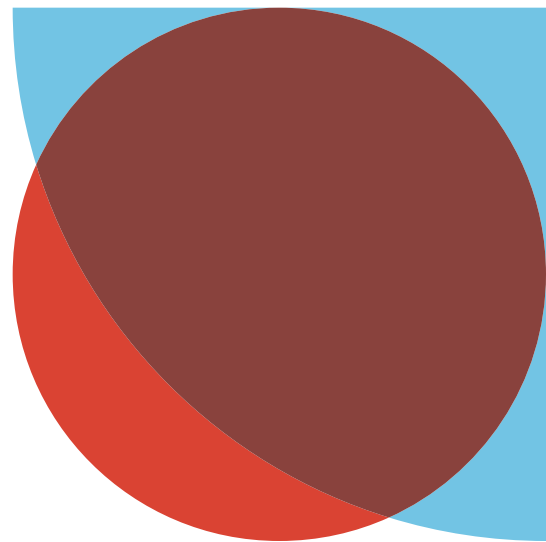
Essay 08

A Third Way

Algorithms and Teacher
Empowerment for Every
Individual

Jim Knight

Chief Education Adviser, TES Global



Achieving the U.N. Sustainable Development Goal 4 for Education will require a rapid increase in the effectiveness of schooling for every child.

Policymakers, therefore, face finding a new schooling paradigm that both prepares every individual child for a very dynamic workplace, and doing so at scale.

The current Western model of schooling is neither working well, nor is scalable, and so it is natural that we should turn to technology for a solution. Wherever on the spectrum you are between algorithmic automation of teaching and letting children loose with computers as self-directed learning, it seems remarkable that all these roads lead to teacherless schooling. There must be a third way that retains the profoundly human endeavor of teaching.

The opportunity is for teachers to deliver a more universal individualized education by being empowered with digital algorithms, not enslaved by them.

It is worth acknowledging that analog algorithms already exist in traditional school classrooms. Teaching to strict lesson plans, to textbooks, to scripts; these are analog teaching algorithms and are now highly replicable in a digital age, largely by machines. They were forged in an industrial era in order to teach content at scale, and dependent on expensive highly educated teachers.

We are now in an era where even highly skilled work is under significant threat from the rapid development of intelligent machines. According to the Oxford Study Group, 35 percent of jobs in the U.K. and 47 percent of the jobs in the U.S. will not exist by 2033.¹ How does a teacher, school leader, or policymaker know, with confidence, what to prioritize if they are to prepare a child for such an uncertain future?

The established model of schooling is not only becoming unsustain-



able in cost and supply of talented teachers, it will also have to rapidly improve its ability to educate children to higher levels of technical and creative skills. Our schooling systems need to prepare people to effectively compete with machines—or to work effectively alongside them. Can schools use machines to help tackle that challenge?

Bridge International Academies is delivering low-cost private education in some of the poorest countries in the world, at scale and with positive outcomes in literacy and numeracy test scores.² Due to their low-costs, their popularity with parents is seen in their growth. They are ruthless in driving down cost through economies of scale and standardized practice. This extends into the classroom where teachers use lesson scripts from tablet computers and managers use the data to monitor the progress of each lesson.

For Bridge, the challenge of quickly scaling primary education quickly is being solved by commissioning experts to design the detailed process of teaching and delivering it through digital algorithms to low-skilled teachers. The reach of a few experts is significantly scaled by a blend of technology and de-skilled teaching. There is, however, currently little clarity on how teachers will grow in their autonomy. They are being programmed like machines with algorithms, so why not replace them with machines that will more reliably follow the algorithm?

At the other extreme, Professor Sugata Mitra is trying to tackle the challenge of learning in places where there are few competent teachers. He is investigating the potential of self-organized learning environments and a question-based curriculum. He has shown that children can teach themselves how to use computers and the internet through shared digital resources. So, as a result, they can effectively acquire knowledge, with adult encouragement and supervision, but no trained teachers. This has not been delivered at anything like the scale of Bridge but it avoids standardization. It embraces self-directed learning, but does it deliver education? Does it “school” children to behave as parents and their communities would want?

This goes to the core question of what we now want from schooling.

Do we want every child to complete schooling and enter adulthood equipped with a canon of knowledge about a broad and balanced curriculum? Should they also have social skills of empathy, communication, and resilience? Do they also need to be creative and skilled in making

things as designers, engineers, and performers? What behaviors do we need children to comply with to succeed?

Our whole education system is designed to test individuals against an average ability to recall a standardized curriculum. Those with the best scores go to the best colleges and then get the best jobs. It is a talent sifting machine created during a time when mass employment was low-skilled and choking human potential was sustainable. But it is inadequate in an era when people are competing against machines and need to maximize their uniqueness.

In *The End of Average*, Todd Rose argues that “today we have the ability to understand individuals and their talents on a level that was not possible before.”³ His attack on the Taylorist education system is devastating, concluding that “traditional public education systems violate the principles of individuality.”

He advocates genuinely individualized learning, which is beyond personalized learning experiences designed to get learners to pass standardized tests. He wants us to move from Taylorism to a tailored learning experience. His answer is to break up qualifications into credentials, to replace grades with competency-based judgments, and to allow learners more self-direction in their learning.

This would create a flexible infrastructure for the sort of system being explored by Sugata Mitra but retaining a place for teachers. Learners would be free to learn their passions. They could get credit for what they know, what they make, and what they can do. Their credentials become their individual learning “playlist” that needs no qualification wrapper. This, in turn, allows potential employers to search beyond the blunt summation of a single grade and find the more precise mix of competencies they need.

This flexible, individualized system may also be scalable. A range of online and face to face learning resources could be used, including more peer learning. There would be a better continuity of learning experience between the more social learning in early years and self-directed research in higher education. Employers may also find an improvement in the soft skills they crave such as communication, and collaboration—the same human skills that give people a competitive advantage over robots.

What is the role of the teacher in this model? And how can there be confidence that the self-directed learner is pushed to be the best they can be



by working hard to realize the potential of their individual talents?

Teachers would remain, but smooth the experience between informal and formal learning. Learners are used to digital devices that have no instructions, that are intuitive. They should expect the same from formal learning, and to have the exploration and discovery we enjoy when we uncover the mysteries for ourselves. This shifts the teacher from being an instructor to more a collaborator and coach.

Michael Fullan and Maria Langworthy argue in *A Rich Seam* that we need to move teaching from delivery of instructional content to more of a pedagogy of coaching.⁴ They identify “a new model learning partnership between and among students and teachers, aiming towards deep learning goals and enabled by pervasive digital access.” Whilst this owes much to the likes of Dewey and Montessori, they suggest that these partnerships are now emerging as a result of the interplay between alienated students, disenfranchised educators, and the perpetual advances of digital technology and tools.

The coaching pedagogy is fully explored by Daniel Coyle in *The Talent Code*.⁵ Music teachers, sports coaches, and other similar roles train by observing performance, analyzing data, and asking the right questions of each individual so that the work is focused on where improvement is needed.

For example, a great tennis player still needs a coach. Andy Murray is a better tennis player today than Ivan Lendl, but Lendl the coach has played a vital part in Murray’s rise to the top through his understanding of the individual. By working on the right parts of Murray’s physical and mental game, and by nurturing the growth mindset popularized by Carol Dweck, his tennis performance has been elite.

This pedagogy could be applied to a range of learning and requires human skills not easily converted to algorithms. If Facebook is having to hire people to tackle the “fake news” problem, rather than using their world leading algorithm writing capability, then we can be confident that interpreting the range of visual, cognitive, and behavioral signals from a learner is still something we need humans to do.

Every school already employs teachers who are familiar with this pedagogy—in sports, the arts, design, and technology. They are familiar with subjective forms of assessment that are vested in the expertise of the

assessor to judge the competence of performance and exhibition. At schools like the Apollo School in Pennsylvania, they are developing this to create a very different learner experience across the curriculum.⁶

The opportunity is for teaching to evolve these pedagogies at scale. In order to best coach their pupils and keep workload manageable, they need the assistance of technology to inform their professional judgement.

Rose Luckin and Wayne Holmes argue that artificial intelligence is the new teaching assistant in the classroom.⁷ Enhanced data analytics, together with machine learning functionalities, offer the promise of significantly enhancing teachers' ability to coach each individual's learning. It also has the potential to capture performance in real-time, releasing time and money currently spent on assessment.

This has implications for teachers wherever they are in the world. Using the digital algorithms behind AI to make previously inconceivable practices possible can transform our chances of rapidly scaling effective universal education. Either we can digitize the algorithms of standardization and scale by de-professionalizing teachers to deliver traditional schooling, or we can develop a new generation of professionals with new pedagogies to wrap teaching around individual learners.

In the modern economy, the current established schooling system is failing too many learners. It is not financially sustainable, teachers are leaving the profession, and child mental health problems are rising. We should not persist with a model that is making our children sick.

A system that believes in, and empowers every child, is possible. It can use latent resources such as personal devices, community infrastructure, and peer assessment. It can make the teaching profession more sustainable by relieving much of the workload pressure of teaching with digital tools and algorithms that can also give teachers insight on their learners, and allow pedagogy to be redefined.

A system that connects learners to their passions can, in turn, connect teachers to the passion of their vocation. Empowered by enslaving the algorithm in the service of the teacher, rather than enslaving the teacher to service the algorithm, we can revive a teaching profession that can rediscover the love—in their practice, in unlocking learning and in helping all individual children grow.



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Jim Knight

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Jim Knight is Chief Education Adviser at Tes Global. In his previous role at the company he was the Managing Director of Online Learning, where he built an online teacher development platform. He is a member of the House of Lords and a visiting Professor at the London Knowledge Lab of the Institute of Education. As a minister his portfolios included rural affairs, schools, digital and employment. He attended weekly Cabinet in 2009-2010, before joining the Lords after the 2010 General Election. Jim is also involved in developing solar powered digital projectors for wireless use with iPads in schools in Africa and Asia, and on malaria diagnosis using smartphones. He is chair of the Tinder Foundation and the Nominet Trust.

Essay 09

Creating More Caring University Classrooms

Kim Samuel

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It's been 25 years since educational scholar and philosopher Nel Noddings authored "The Challenge to Care in Schools: An Alternative Approach to Education," championing caring relations as fundamental to teaching and learning.

She argued that rather than focusing narrowly and obsessively on curriculum, a crucial goal for every school should be preparing young people to care—about knowledge, about the planet, and about each other.

Today, ongoing debates around assessment notwithstanding, educators largely agree that the best educational environments are caring spaces.¹ Yet, most of the work around caring classrooms is focused at the primary and secondary levels.

Consider that in Canada, 66 percent of university students said they felt "very lonely" in the last year. In the United States, the most recent National College Health Assessment found that 19 percent of students had felt "things were hopeless" within the past two weeks, 50.8 percent had felt overwhelmed, and 25.5 percent had felt very lonely. And in the course of just one year, from 2014-2015, 80 percent of universities in the U.K. reported an increase in student mental health issues. As such, I believe we must weave caring, connectedness, and compassion into post-secondary education as well—for the sake of students, professors, and society as a whole.

Noddings powerfully challenged the notion of "caring" as something that involved the teacher only. It is not enough for teachers to throw themselves into their work; students have to feel "cared-for." In Noddings' view, the affirmative response of the cared-for is as vital as the attention of the one-caring; it is in that engagement and mutual exchange that the most significant advances can occur. Moreover, the reciprocal nature of the relationship benefits both sides: Building trust that makes students more



open to the material teachers are teaching; surfacing information about students' individual strengths and interests that help teachers better tailor their lessons; and inspiring teachers toward continual self-improvement in an effort to better serve their students' needs.²

Last fall, I had the opportunity to put those principles into practice in the university environment. I taught an interdisciplinary seminar for fourth-year students at McGill University titled "Lessons of Community and Compassion: Overcoming Social Isolation and Building Social Connectedness Through Policy and Program Development." This was the first course of its kind, exploring the concepts of isolation and connectedness as they relate to marginalized communities around the world. The 35 students who enrolled came from a range of backgrounds, and most had never met each other before.

I wanted to design for them the kind of course that I never experienced as a student myself. My goal was to foster a sense of community within the classroom that ultimately would transcend it, where every student would feel secure, and no one would feel alone. Put another way, I wanted our time together in the classroom to be a microcosm of the socially connected world we talked about each week: A place where there was no "other"; there was only all of us.

To me, a caring university classroom rests on a new kind of "Three R's": Respect, Recognition, and Reciprocity.

Respect means that students know that their voices and experiences are valued and heard. Recognition means that everyone is seen and accepted for who they are, as a whole person—not just a number or a grade, but an individual whose unique differences are welcomed. Reciprocity means that everyone has something to give, and something to gain. No one is above anyone else. We learn, and teach, together.³

Even small gestures can go a long way toward cultivating inclusiveness and support. By making a point to quickly learn my students' names, and consistently encouraging new voices to participate in class discussions, I signaled to my students that their presence was welcomed and their ideas mattered—not just to me, but also to the rest of the class. As the semester progressed, I was heartened to see them eagerly reciprocate. They collaborated with one another both inside and outside the classroom. They took the initiative to create a Facebook page to post and comment on material inspired by what we were learning in class. And when

the proverbial bell would end class conversations before we reached a satisfactory conclusion, they came to office hours to pick up where we left off.

I don't think it's an exaggeration to say that caring university classrooms can be a matter of life and death for young people navigating a critical and often stressful path to early adulthood.

Trends like these suggest that university life needs an infusion of caring and community. Such an infusion would fortify students—and nourish faculty, too. In the United States, for example, the most recent National Survey of Student Engagement found that 34 percent of first-year students say they *never* discussed course topics or ideas with a faculty member outside of class. Fifty percent say they *never* worked with a faculty member on anything other than coursework. This lack of personal connection and interaction is a terrible loss for both sides.

After all, many professors are drawn to academia by a desire to teach: To share their passion for a particular subject and to engage their students on a deeper level. Yet, the institutional demands of academia—administrative work, fundraising for scholarship and research, and, for newer professors still on the tenure track, the pressure to “publish or perish”—can overwhelm the time and incentive to focus on the art of teaching, much less to focus on building relationships and community with and for students.

We must make it easier for university professors to impart their gifts as teachers and as carers: To enable them to build real relationships with students beyond simply lecturing and grading, so that everyone works toward a common goal of learning and discovery.

The bonds students develop with professors and peers have a significant impact on their happiness. Feeling connected makes a difference in their academic achievement, too. As Daniel Chambliss—a sociology professor at Hamilton College and the author of *How College Works*, a book examining the importance of relationships in undergraduate careers—put it, “the key to motivation is face-to-face contact with another human being... It's all about people, not programs.”⁴ Having access to professors provides direct motivation and critical encouragement for students to excel in their learning.

Others have echoed Chambliss's findings. In a study on the connection



between faculty practices and student engagement, researchers from the University of Iowa and Michigan State University concluded, “The educational context created by faculty behaviors and attitudes has a dramatic effect on student learning and engagement. Institutions where faculty engage students in and out of the classroom and place a high priority on enriching educational experiences had students who felt supported and were active participants in their learning.”⁵

When people feel secure, when they feel accepted, an environment is established in which the best learning can flourish.

Plus, there is another important benefit that flows from a caring classroom. Belonging can inspire students to heal the world they are inheriting. Through receiving caring and being part of a caring environment, students become connected to their teachers, their peers, and their learning in a reciprocal and empowering relationship.

This rising generation is already eager to contribute to the betterment of society—and one in four young people say that “more knowledge about how to get involved would be most likely to help them” do so.⁶ They already believe in equal rights and equal treatment. They’re already open-minded and accepting.

The most important thing we need is to get young people to believe in *themselves*.

If young people can see that they have the power to make a difference, they’ll do the rest on their own. We must show them how engaged citizens can advocate for strong, healthy, connected communities. We must teach them to channel their own voices to drive change. We must equip them with *agency*—not just to be in the world, but also to lead it.

Belonging helps foster this agency for positive change, which as in Amartya Sen’s conceptualization relates not to power over others but rather, empowering and enabling others. Indeed, agency is the person’s ability to act on what they value and have reason to value which serves to strengthen our collective interest in ensuring young people have access to and begin to see caring as a core value.

One of the things I did in my class was to introduce guest speakers. I was fortunate to be able to recruit distinguished men and women—journalists from *The Washington Post*, researchers from Human Rights

Watch, non-profit leaders, activists, and more—each combating isolation in their own way. My students said it was hugely inspiring to hear these individuals' stories, and to see that there were so many ways to make their mark on the world.

There are many other ways to help young people find their own pathway forward. Inspired by our experience as a class, my students organized a discussion on campus called *Teaching with Compassion: Holistic Approaches to Building Community in the University Classroom*. The students polled their fellow students and subsequently invited a panel of McGill professors to share their own experiences and perspectives. Each of the speakers had been nominated by students because of their dedication and effective approaches to teaching. As the co-organizers explained in their welcoming remarks, the faculty members on the panel were fostering belonging in the classroom, whether they know it or not; and each of them makes their students feel like “more than just a number.”

The event was an opportunity to share and mutually support efforts that foster belonging and care in the classroom from diverse disciplines. Professor Lisa Trimble, from the department of integrated studies in education, spoke of the importance of knowing her students' names and stories, and of being meaningful and authentic in interactions. She said that students need to be given “low-stake opportunities” to try out ideas. Physics professor Ken Ragan described how he strives to make his students feel like scientists. Tina Piper, who teaches in the faculty of law, said she encourages students to connect their own experiences to what they're learning.

Current institutional structures and even the labeling and design of spaces especially within the post-secondary environment can lead to an uncaring environment. When classrooms become formal lecture halls with professors situated at lecterns presiding over students, we create distance as opposed to connection. Professor Trimble also noted that institutional policies, such as how and when students must submit assignments can run counter to supporting students. “When we only define student success by grades,” she said, “we lose the human experience.”

I couldn't agree more. It hearkens back to Nel Noddings' observation that “What we learn in the daily reciprocity of caring goes far deeper than test results.”⁷



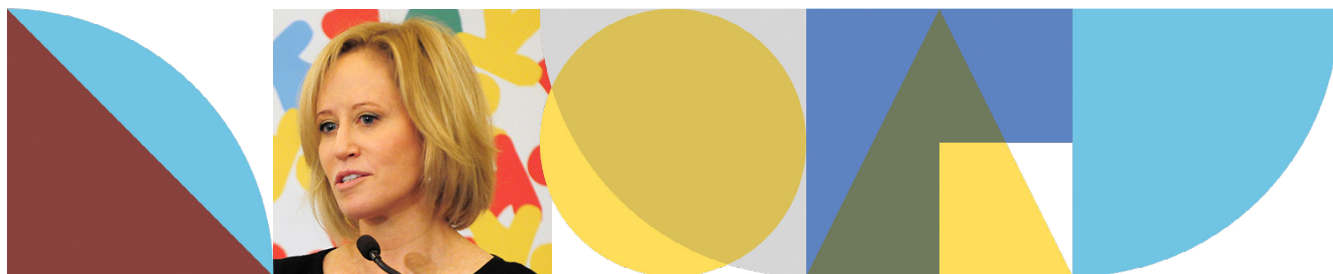
At the end of the semester, I told my class how proud I was of them. I said I believed in them. Every single one. I meant it from the bottom of my heart. Afterward, one of my quieter students approached me, and said, “Nobody has ever said, ‘I believe in you,’ in my whole life.” My last words to her, and her last words to me, were transformative for us both. As a professor, I’d helped her see her own potential—and, as a student, she had helped me see mine. Respect, recognition, and reciprocity had uplifted us both.

I’m still in touch with the majority of my students. I can see them putting knowledge into practice. Some of them now volunteer together in Montreal. Some have plans to start social enterprises to build more connected communities. Others want to create a kind of support network when they graduate, so future McGill students can benefit from their experience and advice. All of them say the relationships they forged were what made the class so special.

To me, it’s the blossoming of tomorrow’s global citizens, who will put connectedness first; who welcome difference, embrace diversity, and will resist the calls for walls. If we want the world to start building more bridges, let’s create more caring university classrooms.

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Kim Samuel is President of The Samuel Family Foundation, Professor of Practice at McGill University's Institute for the Study of International Development and Policy Advisor to the Oxford Poverty and Human Development Initiative (OPHI). Ms. Samuel is a pioneer in the field of social connectedness and its significance to inclusive policy and program development, particularly in relation to multidimensional poverty. Under Ms. Samuel's leadership, The Samuel Family Foundation has actively engaged in a number of collaborative partnerships supporting community driven solutions to achieve sustainable change. In October 2016, Ms. Samuel convened the second Global Symposium on Overcoming Isolation and Deepening Social Connectedness. Also in 2016, she designed and delivered the first academic course in this emerging field to graduating students in international studies at McGill University and is teaching a new cohort in 2017. Ms. Samuel is a prominent speaker, commentator, and author featured regularly in the Huffington Post: <http://www.huffingtonpost.com/author/kim-samuel>.

Essay 10

Firetrucks on Ivory Towers

J. Philipp Schmidt

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Seymour Papert, the late mathematician, computer scientist, and founding faculty member of the Massachusetts Institute of Technology (MIT) Media Lab, cared deeply about designing technology that children could use to learn mathematics.

But instead of designing a better Algebra textbook, he envisioned a world in which children would learn math in the same way they learn French if they grow up in France. To me, that is a compelling starting point for a discussion about the future of learning and education—thinking about the world and the systems we could design that would allow all of us to learn this way.

However, the more common approach to exploring the future of education looks at traditional forms of education and attempts to improve them. This strategy of incremental innovation has led to dramatic improvements in access to and quality of schools around the world. But it is not the best way to imagine what a fundamentally different system of education could look like. And given the fact that mobile phones and increasingly ubiquitous connectivity are radically changing how we create and share knowledge, this might be a good moment to allow ourselves to think beyond the incremental improvements. With that in mind, I would like to extract some principles from a range of stories about how people learn at MIT in the hope that they provide some inspiration to what new systems of learning might look like.

The first story starts on a September morning in 2006, when the MIT community awoke to the sight of a bright red fire truck on top of the MIT Dome, arguably the most stately building on campus. The backdrop to graduation speeches, to age-old academic rituals, and, occasionally, to the MIT Media Lab soccer team's practice games. And now, a 150-foot high parking ground for a fire truck. Who had placed the truck on top, how had they managed to do it, and why?

I came across the story of the “fire truck hack” during a series of interviews the Media Lab Learning Initiative conducted to find out *How MIT (really) Learns*. We spoke with people from across the MIT community—including an admissions officer, a professor who spent his entire career at MIT, the Dean of the undergraduate research opportunities program, and current and former students. We asked participants a few simple questions, including “What was your most memorable or meaningful learning experience at MIT?”

One might expect the stories of how MIT learns to include great classes, well-designed classrooms, inspiring professors, and challenging exams. In fact, those things almost never came up. The stories we heard were a lot more surprising and interesting.

The thing that stood out about the fire truck hack was that it was at once an act of disobedience, breaking the rules (and potentially some laws), and at the same time a significant and deeply meaningful accomplishment. The undergraduate student who had orchestrated it said, “Without a doubt, the most important learning experience I have had at MIT, and the achievement I am most proud of, is putting the fire truck on top of the MIT dome.”

What may not immediately sound like a learning experience, was actually a marvel in organization, coordination, and engineering. Let’s consider the logistics. The MIT dome is 150 feet high. The fire truck was assembled out of 57 parts, the heaviest of which weighed 150 pounds, and the largest spanned 12 feet. A team of 40 students from different academic programs spent three months carefully designing, planning, testing, and practicing. Finally, they executed a precision installation that took place in total darkness and was completed in less than 30 minutes.

Not only did the students demonstrate technical prowess, teamwork, and ingenuity, they also showed a lot of responsibility. In the process of installing hundreds of pounds of material, they made sure that nobody got hurt (or caught) and they left detailed instructions for the disassembly of the fire truck—possibly because they weren’t sure the actual fire brigade would be as careful as they had been. The installation was deemed so reliable that campus safety officers left the truck up for a few extra days. They were confident it did not pose a risk.

In short, the students displayed all the competencies and skills we would



hope to see in a graduate from an engineering program at a good university. For anyone interested in learning and education—that is a puzzling result. If at one of the best universities in the country, the most important learning experience a student can have, is not part of the curriculum, not endorsed by the university—in fact, it is both illegal and dangerous—and it can never be listed on a transcript or cited by other researchers, then what inspiration could we take from this story to redesign the rest of the education experience?

How do we know the fire truck hackers really learned something in the process, and were not just demonstrating the things they had learned already—maybe even while sitting in a classroom? We did not try to calculate a score for the students' ingenuity, creativity, or ability to motivate others (using such sophisticated technologies as cookies and pizza), but we did collect rich evidence of their learning processes. We asked what they themselves considered their most meaningful learning experience rather than offering a list of possibilities and then followed up with questions about the process and the outcomes that made it so meaningful. While open-ended interviews do not give us easily quantifiable data, they allow for deeper reflection and introspection and may surface learning outcomes that standardized measures would miss. We not only heard about what the students did, or what they thought they had learned, but also how they felt about the experience, and why they chose a particular path. For example, we learned that the fire truck hackers sought out knowledge and resources that went well beyond their coursework, such as the Massachusetts amendments to the International Building Code 2009 (IBC) or the CMC Rescue catalog of equipment for rescue professionals. We also learned some of the competencies the students felt they had developed through the project including ingenuity, motivating teams, persistence, and engineering skills. In other words, in addition to the visible achievement of having successfully placed a fire truck on top of a very tall building, the students showed the type of metacognitive skills that correspond to executive function and other abilities that are often correlated with high-performing learners.

How can we connect this kind of exploratory, messy, disobedient way of learning with the structure and predictability of schools and universities? At the Media Lab, we use a simple framework called creative learning. It comprises of the four Ps: projects, passion, peers, and play. We cannot take credit for the fire truck hack, but it is a great example for creative learning: Students working on a Project they are Passionate about, with their Peers, and doing so in a Playful manner.

Not only is creative learning a framework to design engaging learning experiences, it may also help students develop the skills and competencies they may need most. There is now widespread agreement that many of the jobs that are currently filled by humans, will be performed by computers and robots in the future. The easiest jobs to replace are those built around clear sets of instructions, because computers tend to be better at following rules than humans. But there are another class of jobs that will be harder to replace: Jobs that involve creativity, collaboration, and empathy—the types of skills the fire truck hackers demonstrated. And beyond jobs, in these turbulent times, the importance of questioning authority and developing better solutions—technical, social, political—rather than waiting for others do it, cannot be stressed enough. Yet, much of our school and university curricula reward those who demonstrate they can follow the rules instead of encouraging experimentation and risk taking. This may be even more true in earlier years of schooling than in university. Is our education system preparing students for the kind of jobs that computers will be doing in the future?

However, the institutional structures of education were not designed to nourish, foster, and support the type of constructive disobedience that the fire truck hackers displayed. Some of the other stories we came across as part of the *How MIT (really) Learns* project may offer a starting point for changing that. Kim Vandiver, Professor of Mechanical Engineering, and for many years the head of MIT's Undergraduate Research Opportunities Program (UROP), told us about the MIT students' solar car team, who wanted to travel to Australia to participate in the very first solar car race. Driving a car built by students through the desert in Australia is an inherently risky undertaking. And in fact, traveling at 50 mph, the MIT car flipped over and rolled during the race. But due to careful planning by the MIT students, it was also the only car with a roll bar and a seat belt and so nobody got hurt. It wasn't clear if Professor Vandiver told us this story as an example of a learning experience he had mentoring students or a learning experience the students had, but we suspect it was a bit of both.

Chris Peterson, from the MIT Admissions Office, who travels around the world trying to convince the most talented students to come to MIT, calls this approach “crash pads rather than training wheels.” It is OK to crash, in fact, the importance of failure and overcoming it have been established as essential parts of the learning process, as long as it is safe to do so. For the university, this may mean creating more spaces for stu-

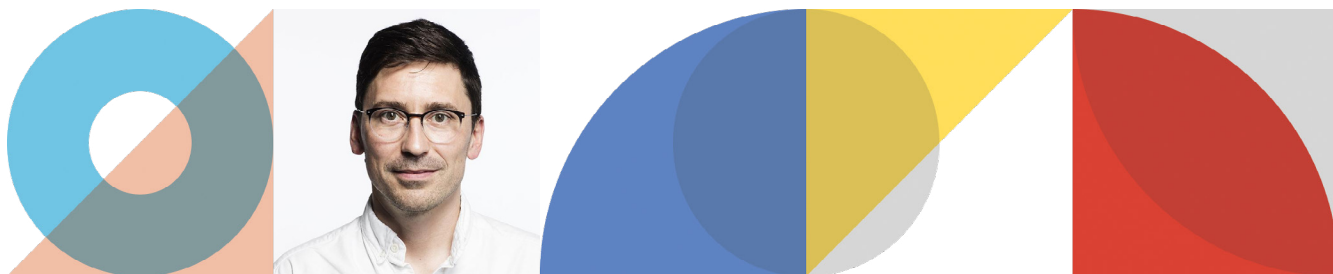


dents to take risks and ownership of their education, but making sure it is safe to do so. The good news is that small changes can go a long way. For example, MIT makes it safe for students to experiment with different subjects during the first year of their undergraduate experience because no record of failed classes will appear on the final transcript.¹ Failing a class is still a difficult experience, but MIT has put in place the crash pads needed to make it safer.

To find other inspiration for structuring education to support creative learning, we may have to allow ourselves to open the doors and windows of our classrooms and look on top of buildings. Rather than focusing too much on measuring, predicting, and managing education we might be well served to create more open spaces for students to follow their own curiosity, allowing them to seek solutions to problems they care about, preparing them to use technologies with creativity and responsibility, and instilling in them the confidence they need to overcome hard challenges. In other words, let's make schools and universities the places where students can develop the types of skills and competencies needed to place a fire truck on the MIT dome. Because that may be our best strategy to prepare them for the uncertain future they are growing up in.

ENDNOTES

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J. Philipp Schmidt

Director of Learning Innovation, MIT Media Lab

J. Philipp Schmidt is Director of Learning Innovation at the MIT Media Lab, where he leads the ML Learning initiative, teaches courses, and conducts research on learning communities. He is also a cofounder and board member of Peer 2 Peer University (P2PU), a non-profit organization that provides access to online higher education through public libraries. Philipp served on the founding board of the OpenCourseWare Consortium, co-authored the Cape Town Open Education Declaration, and is an advisor to a number of non-profit and for-profit education projects. He has received Shuttleworth and Ashoka fellowships, and came to MIT as a Media Lab Director's fellow. Philipp moved to Boston after spending ten years in Cape Town and has given up trying to get used to the weather.

Essay 11

New Frontiers in Technology for Assessment in Low-Income Contexts

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“We need assessment approaches that inform and guide children’s learning progress, and stay current with the skills and content being taught.”¹

In education circles, consensus is growing that commonly used assessments aren’t capturing the breadth of what children are (or should be) learning. A recent Brookings Institution study indicates that, while educators and education stakeholders worldwide share many of the same expectations of what skills are important for future generations, countries are at very different stages and are using different approaches to get there.²

Assessing students’ skills—as one moves away from basic reading, writing, and mathematics towards critical thinking and problem-solving skills—becomes increasingly difficult with standard pencil and paper assessments. Assessing such complex skills using traditional methods also strikes experts as less and less authentic. However, it is costly and training-intensive to try to assess a group of students’ problem-solving or team-working skills via close observation. We claim that the use of technology for assessment has great potential, especially for assessing complex skills, and including in low-income contexts.

TECHNICAL CHANGES BROADEN OUR POSSIBILITIES

To date, the use of technology for assessment has focused on improving data quality and the efficiency of assessment. Electronic testing has a long history in large-scale standardized student assessment in high-income countries, for example via the cognitive Scholastic Aptitude Test (SAT) or Graduate Record Examinations (GRE). Likewise, electronic platforms to facilitate oral early reading and numeracy assessments are widely used for sector diagnostic and program evaluations in low-income settings. Such technology facilitates efficient data collection and management and allows experts to make assessment data actionable through

just-in-time analysis and built-in decision support for non-technical decisionmakers.

Advances in the computational power of handheld devices and psychometric tools have dramatically facilitated adaptive testing. Although such methods have been used in large-scale standardized tests (e.g., the Graduate Management Assessment Test, or GMAT), they can also be used for self-assessment and self-directed learning. Since the early days of drill-and-practice software programs, computer-assisted learning has proven its utility by virtue of being responsive to certain objective forms of input, thus allowing individuals to gauge their own progress and skills gaps. The virtue of adaptive testing is that, at least in principle, it can offer the promise of instruments with validity and reliability at both ends of a cognitive scale, and have practical utility for countries as diverse as Finland or Burundi.

LEVERAGING TECHNOLOGY TO BETTER ASSESS “COMPLEX” SKILLS

We argue that technology can bring assessments closer to revealing the true manifestation of the skills or abilities under investigation. Technology also offers opportunities for new assessment methodologies that provide a more differentiated and holistic understanding of a child’s capabilities and needs.

By leveraging technology to better approximate real world situations where assessed abilities are manifest, we hope to address two inter-related problems in traditional assessments: Measurement impurity and ecological validity.

Measurement impurity refers to the phenomenon whereby scores that result from an assessment represent individual differences in both the primary construct of interest, as well as a host of correlated processes or constructs. For example, measures of inhibitory control index individual differences in inhibitory control, as well as individual differences in processing speed and receptive language (which informs the ability of a child to understand the task). Measurement impurity thus undermines the very premise of assessment as we may not be measuring what was intended.

Technology may help detect the behavioral and/or physiological signa-



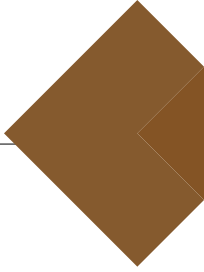
tures that accompany many cognitive constructs. The ability to acquire and rapidly integrate these sources of information with task performance allows for more precise measurement and can potentially refine the characterization of the construct under study. This gets us closer to answering fundamental questions about whether a student's progress (or lack thereof) may be hindered by underlying difficulties or under-developed non-cognitive processes. An example of technology-mediated multi-modal assessment is the work done by researchers at Stanford University combining data on student gestures from a Kinect sensor with data logged from a tangible user interface, while students worked in pairs to solve a cognitive task.

The ecological validity problem refers to the disconnect between the contexts in which cognitive assessments often occur (i.e. emotionally neutral, one-on-one, minimal distractions) and the contexts in which the assessed abilities and skills are drawn upon (i.e., emotionally variable, social settings with competing, complex demands for attention). Thus, the ecological validity problem limits the validity of standardized assessments as predictors of real world outcomes.

Assessing Employability and 21st Century Skills

Gauging employability and 21st century skills that combine cognitive and non-cognitive domains, particularly aspects of collaboration, communication, or problem solving is vital. Technology can help in the construction of assessments that better resemble the contexts in which skills are required. This may include leveraging simulations, games, and/or agent-based modalities to better approximate real-world demands. For example, to measure collaboration, traditionally highly qualified assessors would observe students in a simulation designed to evoke teamwork. While this ideal is achievable, it is also prohibitively expensive to conduct at scale. Costly human endeavors happen to be where technological solutions can assist in providing substantial efficiencies; we recognize that a technology-based replacement of a human-operated assessment environment may not be a fully equivalent replacement, but what we give up in genuine representation we may recover in cost efficiencies and in the richness of other peripheral and physiological data.

Illustrative of this kind of technology for assessment use is the work on SimCityEDU by GlassLab, Pearson and Educational Testing Service (ETS), which deploys an environmental simulation game where students find solutions to increasingly complex environmental challenges while

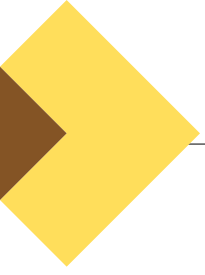


being assessed on their ability to problem solve. Another example is the work on stealth assessment by researchers at Florida State University. Stealth assessment, in the context of game-based assessment, means not just tracking a player's score on the game, but also a player's progress on unobtrusively embedded assessment items on specific competencies, such as the ability to resist distractions, or to quickly identify patterns.

For low-income countries, RTI International has been researching the use of short, tablet-based games to assess employability skills such as task completion, time management, and problem identification. Most non-cognitive skills, unlike academic competencies in reading or mathematics, are inherently difficult to quantify, and thus their measurement has often relied on self-reported or trainer-reported questionnaires which are limited in the degree to which they provide evidence of the skills in question. While assessing skills in a simulated or mixed-reality environment is still only an approximation of the real world, these technology-mediated assessments make it possible to measure a student's application of these skills in a range of scenarios. This approach, in theory, should present a more nuanced understanding not only of the degree to which students exhibit these skills, but also under what conditions.

Formative Assessment

In the above examples, we have predominantly described the use of technology for summative or one-time student assessments. Technology can also facilitate continuous assessment, personalized learning, and the strategic selection of assessment items. This makes it possible to track individual student performance over time, and provide data-informed instructional guidance. In the United States, there are numerous such technologies already available, especially for assessments in reading, writing, and mathematics. In this U.S. case, the technology offers potential for instruction that bridges the gap between what individual students currently know and what they are expected to know. While it may be ambitious to expect teachers, especially where capacity is low and classes are large, to implement personalized instruction, such technology does support instructional decisionmaking in pacing, grouping, and material use, thus responding to students' needs in consideration of the curriculum. To date, however, there are few published examples of the use of technology for formative assessment in low-income contexts.



Identifying Disabilities

Furthermore, recent advances in electronic disability screening platforms for mobile devices are opening opportunities for more comprehensive assessments and understanding of learner capacities and needs. In Ethiopia, RTI has leveraged mobile phone-based technology for vision and hearing screening of over 3,700 students in combination with an electronic assessment of their reading skills. In another example, researchers at the University of Jyväskylä in Finland are examining the feasibility of a phonological awareness game to predict student dyslexia. In the United States, a team of researchers at the University of North Texas are investigating the use of Virtual Reality to assess neurocognitive skills and deficits, including supervisory attentional processing and Attention-Deficit/Hyperactivity Disorder. Technology thus facilitates the integration of a range of assessment methodologies, providing a more differentiated and holistic understanding of a child's capabilities and needs.

POSSIBILITIES AND LIMITATIONS

Not every assessment situation lends itself to the use of technology, however. A recent reading and mathematics assessment done under the U.K. Department for International Development-funded Girls Education Challenge in Afghanistan reverted to the use of paper and pencil since electricity supply for technology-assisted data collection was impossible to guarantee.

The deployment of technology-mediated, multi-modal assessment approaches combining cognitive assessments with physiological data, may also not be feasible at scale in many settings. Instead, for the next few years, using such methodologies could inform the design and improvement of the assessment (e.g. its length), as well as related intervention programs, through relatively small sample-based applications. Eventually, such technologies could be used for universal measurement.

Similarly, the use of technology to facilitate sustained personalized assessment and content provision at the child level, is likely to remain unaffordable in low-income contexts at least for the next five to 10 years. Low-cost tablets cost around US\$40, an insignificant amount for high-income countries that spend upward of \$15,000 per student per year. But this is likely too high in countries like Malawi, which spend only \$30 per primary student per year.

The key questions to answer in using technology for assessment, include: What is the added value of the technology? What kind of interference will potentially come from use of the technology for assessment? How does introducing technology change what we are measuring? What may be possible ethical or privacy concerns in relation to the use of technology for assessment?

Furthermore, with the powerful presence of social media, we leave a trace not only of our “likes” and (implicit) dislikes, and therefore of our psychological makeup and its correlates, but, importantly from an educational perspective, we leave a trace of our cognitive skills and preferences. Facebook postings could be analyzed for our writing skills, what we search for in Google could be analyzed for the sophistication, so to speak, of our concerns. Short cognitive tests, common now in Facebook as a fun activity, could morph into the opportunity to literally test users for hours and hours and over time. This is likely to happen without the permission of governments, think tanks, academics, or NGOs. In fact, it is already happening. The issue, then, is that, since education remains a public good, how should the public view the use of social media technology in operating educational assessment platforms? While all this may seem futuristic to the poorest 40 percent of the world, current efforts by large tech companies to expand the internet to such segments of the population is profit-driven, and, given the technological might and deep pockets of these companies, is likely to happen before too long.

CONCLUSION

The use of technology for assessment purposes has great potential. Some of it, such as improving data collection and reporting, is easy to realize and is a worthwhile investment even in low-income countries, as the per capita cost of the technology is minimal if millions of children can be reached. Other uses, such as giving children individual tablets for personalized assessments and learning, may be out of reach for some time, especially in countries where the total yearly expenditure per child is lower than the cost of a tablet and capacity for sustained technology support is minimal. There are various “sweet spots” in the middle of these opposites. Ultimately, we believe that technology that improves the authenticity and validity of assessments of students’ complex skills, or that provides a more holistic understanding of students’ capabilities and needs, is worth pursuing.



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Luis Crouch, PhD, is a recognized international leader in providing high-level advice to governments involved in complex educational systems change. From 2011 to 2013, Dr. Crouch served with the World Bank's Global Partnership for Education Secretariat as head of the Global Good Practices Team.

He currently leads work addressing important challenges in education, workforce and youth, and "Data Revolution for Development." He provides input and oversight to key areas of work in all of the International Development Group's themes.

Dr. Crouch is also researching fundamental issues at the leading edge of applied scientific work on education while continuing to pursue his policy advisory work with specific countries in areas such as school funding and educational decentralization.



Carmen Strigel

Director, ICT for Education and Training, RTI International

Carmen Strigel's work in RTI's International Development Group strengthens efforts in areas such as education, workforce development, governance, policy making, stakeholder collaboration, and capacity building by leveraging the potential of Information and Community Technology (ICT). Ms. Strigel has extensive country experience in Africa, Asia, and the Pacific.

In the field of ICT for Education and Training, Ms. Strigel works on teacher training and professional development, e-content and instructional design, methodological/pedagogic integration of ICT into teaching and learning, organizational development and change management, and ICT policies and strategies, with a focus on enhancing instruction and student learning opportunities.

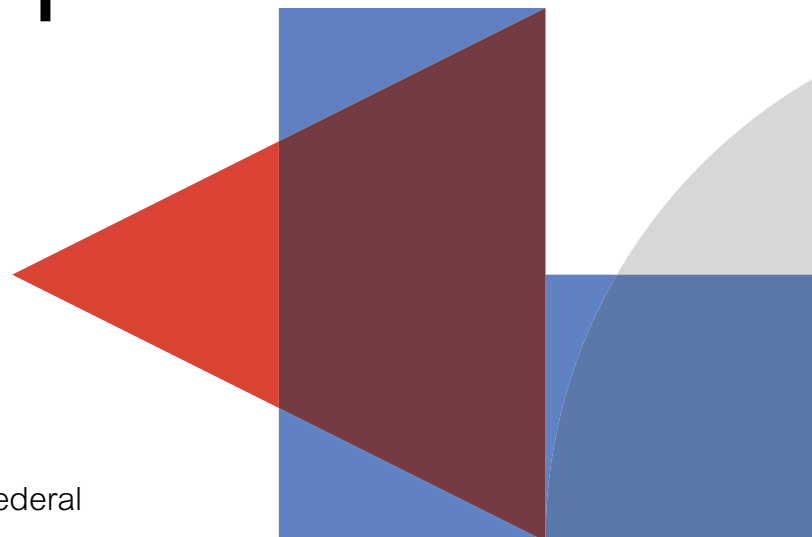
Ms. Strigel designed Tangerine®, a cutting-edge, flexible, open-source electronic data collection software geared specifically for Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA) and optimized for mobile devices. Ms. Strigel has researched, designed, implemented and monitored educational technology initiatives for more than 15 years for the European Union, United Nations Development Program, Asian Development Bank, and the United States Agency for International Development, among others.

Essay 12

The Challenges of Scaling- up Findings From Education Research

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The world of education is stratified into layers (class, school, district, state, country) that differ in orders of magnitude or scales (20, 200, ..., 200 million).

One would expect each layer to be simply the aggregation of smaller-scale units, forming a smoothly continuous system. In this essay, I argue that this is not the case and disentangle causes of this discontinuity. Why do the phenomena that appear at the micro-level not propagate to the meso-, macro- or global level? I consider the case of my research on education, which concerns learning technologies.

One could expect that a learning technology, once proven successful in a rigorous classroom experiment, and then in many classrooms, can be brought to larger scale through policy decisions which would then be propagated 'down' to all classrooms. This rarely happens. I present some systemic, though contradictory biases and myths as my explanation for the observed failure to scale up successful learning technology.

A first remark is that this discontinuity simply reflects the segmentation of learning sciences: Educational neurosciences consider brain areas, cognitive psychologists look at learning processes of individuals, social psychologists study teams of learners, education researchers deliberate classrooms, sociologists research school cultures, education economists research national funding schemes, and political scientists research governance principles. Similar fragmentations occur in other fields, but the specific difficulty to connect the dots across education scales hinders the impact our research has on education quality and reality.

A second explanation is that when it comes to learning technologies, there are two systemic opposing biases. On the one hand, we have "gurus" who systematically overstate the positive outcomes of technologies. Seymour Papert has been one of them: A genius in his work but who promised more effects from using LOGO than what teachers could ever achieve. On the other hand, we witness groundless fears that

technology will damage education: “They need a space away from the space of digital technology,” declared Giles Scott about his students in *The Washington Post*.¹ Let’s consider the ‘gurus’ first, specifically in the context of Massive Open Online Courses (MOOCs). The early hype generated over-expectations, disconnected from empirical data. The example of one kid ($n=1$) from Mongolia who ends up at MIT occupied the media² more than the fact that most participants ($n>1$ million) were white males in their 30’s living in urban areas. Conversely, this second fact should not give ground to negative attitudes: when my university provides a high-level MOOC on digital signal processing, it is completely normal that most participants have a bachelor or a master degree, since this topic is neither relevant nor accessible in earlier study paths.

Many critical voices emphasize the attrition rate of MOOCs (which simply reflects that “registration” does not require more than one click); this criticism neglects the millions of students who received education and acquired certificates from top universities. Regarding the use of MOOCs on campus, we found that students who actively participate to a specific MOOC in Physics, in addition to on-campus activities, obtain significantly higher marks on an exam.³ It is common sense: They engaged more with the learning material. And the relationship may not be causal: It may simply be that better students use the MOOC more since they tend to use any resources we provide them with better. But common sense findings or modest results do not reach headlines; they get lost in translation. On the fear side, our students were strongly against MOOCs, claiming that they would lose contact with teachers. Two years later, the fear was proven unfounded.

In summary, when an empirical finding at scale X is projected to scale Y, it is distorted by unjustified expectations and fears that get more attention than facts. Is this distortion specific to EdTech? No, not even specific to education. As humans, we tend to hear what we are ready to listen to and to see what we expect to see. We also tend to overestimate the significance of exceptions. There are however a few phenomena specific to EdTech research that boost these distortions.

THE MYTH THAT LEARNING EFFECTS ARE INTRINSIC TO SOME TECHNOLOGY

Let’s start with an example from our work on educational robotics. I am often asked about the effect of robots on learning. The answer is simple:



none! In one of our projects, the kids have to teach a small humanoid robot how to write, or to stop it when it makes reading mistakes. They don't learn because they interact with a robot but because they do something demanding with a robot. It is a four dots chain: a technology (dot 1) enables some activities (dot 2) which trigger some cognitive mechanisms (dot 3) that generate learning outcomes (dot 4). *There is no transitivity, no shortcut between dots 1 and 4.*

The same answer holds every time somebody asks what is the effect of MOOCs, or of augmented reality, or any other technology used in learning. I often reply by stating that good MOOCs are better for learning than bad MOOCs. This superfluity effectively illustrates the myth I want to emphasize: it is quite possible to produce a MOOC in which no participant learns anything. What is a good MOOC? Not one with Spielberg-produced superb videos but a MOOC in which learners face rich problem-solving activities (between good videos), at the right, for each learner, level of difficulty. In other words, technologies have affordances, i.e. potential effects; designers are supposed to turn them into actual effects. This myth is behind most failures of large scale educational technology deployment. It explains why the effects observed in small-scale experiments do not scale up: simply stated, **scaling up fails because it is not the device per se that generates effects, it is the activities students perform with this device.**

THE MYTH OF INNOVATION

EdTech are often presented as pedagogical innovations, even if they have been around for decades. I cannot deny that if some robots are used for the first time in a classroom, this constitutes some kind of novelty. Now, if I teach with an egg on my head, is this innovative? Probably, but irrelevant—unless it is dance that I am teaching! Let's avoid the term "innovation" and instead focus on technology uses that address educational problems. For instance, carpenter bosses asked us if we could teach apprentices notions of statics for roof structures without any mathematical formulae. We responded by developing an intuitive augmented reality environment. Whether it is innovative is irrelevant; it only needs to be educationally effective. This strife for innovation may be justified only by the need to resist an even stronger myth encapsulated in "school used to be better in the olden days." Humans have this amazing selective memory that makes them prone to nostalgia: there were so many bad things about the school of our parents, but what gets attention is that pu-

pils made fewer spelling mistakes at that time—the few ones who did get through school. Between nostalgia and innovation, there is space for mature discourse. Now, if I had to, I would rather err towards the innovation side: I prefer a school culture that favors trying new methods, exploring new paths, keeping all actors engaged in efforts to make schools lead the changing society rather than being dragged into it.

THE TEMPTATION TO BLAME TEACHERS

I often hear that the difficulty in scaling up is due to teachers, sometimes also that it is the fault of learners, administrators and/or parents. Let's consider the case of teachers. First, they are accused of technophobia. In western countries, teachers cannot order an airline ticket, a concert ticket, or save their holiday pictures without using technology. They have no issue with technology in general but, if we suddenly introduce 20 tablets into their classroom, we actually create a problem, a super-competitor to kids' attention. Nobody likes a tool that makes their work more difficult. Are teachers resistant to change? Yes, as we all naturally are. One could even argue that they have chose a routine job. But, I suggest we stop blaming teachers, and instead undertake the responsibility ourselves. Technologists: our technologies are not always suitable for schools—for a mountain road one needs a Land Rover, not a Rolls Royce. Consider the login process. When learners have to login, problems arise. Jennifer forgot her password while George pressed the caps lock key. This can waste 5 minutes of the lesson time (i.e. 10 percent, with absolutely no usefulness). We design technology for learners, but forget that a classroom is more than a set of individual learners; it is a collective body orchestrated by a teacher who has to manage multiple constraints: time, discipline, noise, safety, curriculum. Recent work on classroom orchestration has stressed the notion of classroom usability⁴: How demanding is it for a teacher to use digital tools while handling 25 or more kids and all the daily classroom constraint?

TESTING TECHNOLOGIES IN CLASSROOMS IS NOT ENOUGH

Difficulties of scaling up also stem from very small differences between the method or technology used in classrooms during empirical studies and what can be generalized to larger scales later on. There are well-documented methodological biases in experiments, such as the



Hawthorne effect (subjects over-perform because they know they are being observed) or the Rosenthal effect (subjects perform according to their perception of the experimenter's expectations). But, there are also subtler differences that prevent generalization. Teachers who decide to join an empirical study are not selected randomly, neither are they typical teachers; there is a self-selection bias. For an experiment, they might come 15 minutes before the class to prepare the material, while they usually come only a few minutes before. They might allocate 60 minutes to a curriculum item to which they usually allocate only 30. Even if we do our best as researchers to set up ecologically valid conditions, our presence alone changes any education routine and thus distorts the observed effects. Once the same tool or method is used routinely, innovation wares off and these small differences may lead to abandoning the method or tool. Learning science has to integrate these practical details into the understanding of what is a scalable learning technology.

MODELLING THE TEACHER EFFECT

Education research is condemned to generalization: if the learning outcomes obtained with a set of learners cannot be extended to a population of learners with a similar profile, the study is of little use. To reach the necessary sample size for statistical generalization, we conduct the same experiment in multiple classrooms, hoping that the same effect will occur across classrooms. Consider an experiment in which a technology is tested and the researchers find the same effect in each classroom. The researchers would be happy to see that this effect is invariant despite the difference of learners and teachers. In learning science publications, they would be pleased to state that “there is no teacher effect.” Is that really good? How could we expect any engagement of a teacher if we claim that, with some technology, there is no teacher effect? Education is not like medical research: there is not double-blind approach, a teacher may not be unaware of his teaching method. The same point can be made about the school effect: we expect that the same method would work independently of the school, as if an efficient school management were non-significant. One approach to generalization is to consider these variables, teacher-excellence or school-management, as noise and expect noise to cancel out when measuring many teachers and many schools. Another approach to generalization is to model these effects in greater detail (i.e. describe a teacher in our statistical or computational models, not with one, but with many variables that account for their behavior in class).

The problems reported in this contribution are well known in learning sciences. I do not have a magic bullet for them, but some hopes based on new developments in data sciences. Which activities produce learning for an individual is a fundamental question, but answering this question is not sufficient to succeed in scaling up. Scalable models have to integrate many more variables such as classroom logistics, teacher behavior, and school management. I expect that learning analytics will allow us to model rich learning situations, in real classrooms, and to integrate parameters specific to each scale of the education system.



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A former teacher in elementary school, Pierre Dillenbourg graduated in educational science (University of Mons, Belgium). He started his research on learning technologies in 1984. He obtained a PhD in computer science from the University of Lancaster (UK), in the domain of artificial intelligence applications for education. He has been assistant professor at the University of Geneva. He joined EPFL in 2002. He is currently full professor in learning technologies in the School of Computer & Communication Sciences, where he is the head of the CHILI Lab: “Computer-Human Interaction for Learning & Instruction.” He is also the academic director of Center for Digital Education, which implements the MOOC strategy of EPFL. EPFL recently passed over 1.5 million MOOC registrations. He wrote a book entitled “Orchestration Graphs” that proposes a formal language for instructional design (EPFL Press). With EPFL colleagues, he recently launched the Swiss EdTech Collider, an incubator with 30+ start-ups in learning technologies.

Essay 13

We're Not Teaching the Web Correctly

Mark Surman

Executive Director, Mozilla Foundation

Meghan McDermott

Senior Lead, Mozilla Foundation



Web literacy must become a fundamental part of our global education system. Without it, opportunity is squandered. With it, we can propel billions farther, faster.

When Gauthamraj Elango teaches digital skills to youth in rural India, he takes an abstract approach. There are no rote typing exercises in his classes, nor are there intimidating code editors.

Gauthamraj is the co-founder of F-infotech, a Perundurai, India-based social enterprise that teaches individuals of all ages how to unlock opportunity online. When he's in rural classrooms—where some students have never seen a computer—he finds that teaching the general concepts of the web, rather than specific hardware and software, is most effective. Through offline, hands-on activities and roundtable discussions, Gauthamraj and students unpack what a URL is, how browsers are used, and the diverse opportunities an internet connection can unlock. His students aren't simply learning a trade; they're gleaning a fundamental understanding of how the web works.

In a world where the number of internet users is growing at breakneck speeds—and where the internet increasingly shapes all aspects of society—understanding the web is essential for nearly everyone. The internet is the world's newest, most vital, public resource. It continues to expand exponentially. Now, three billion people are online, and new infrastructure and cheap hardware mean billions more will join in the coming years. Internet speeds are accelerating swiftly. And the Internet of Things is connecting the internet to homes, cars, and the infrastructure of cities.

UNLOCKING INTERNET'S POTENTIAL REQUIRES WEB LITERACY

For students like Gauthamraj's, who may not be online for another couple of years, the fundamentals of online life are essential. Without a strong



grasp of web literacy, individuals and institutions will miss the internet's potential, and cannot harness the web for learning. They cannot, as Sam Dyson, Director of Mozilla's Hive Chicago Learning Network, has observed, "use the internet to solve shared problems of practice or life." The internet becomes smaller, scarier, less wonderful.

The problem, both in regions with a pedigree of access (e.g. U.S.), and in regions that are connecting for the first time (e.g. India or Kenya), is that web literacy is largely absent from classrooms. And where it does exist, it remains inadequate.

An adequate education in web literacy would provide a framework for understanding the internet. It's not just about learning to type or to use a computer or smartphone, nor is it about mastering a programming language like JavaScript. It's about the gulf in between. Web literacy requires understanding the difference between a web browser, a search engine, or an app, and being able to leverage each. It's about knowing how to evaluate online content, and knowing how to differentiate between the credible and the dishonest. It's about the ability to thwart phishing attempts, to craft strong passwords, and to control how personal data is collected and used.

In the developed world, access has been a matter of public policy for decades. Individuals who now hold computers in the palms of their hands began their relationship with the internet years ago, seated in front of a desktop. The result is an assumed, or natural, familiarity with the mechanics of the web. Navigating an operating system (OS), a website or a social network is often expressed as second nature. Skills are mostly acquired informally and therefore lack a firm educational underpinning.

Consider Victor, a high school student, swiping through an app store and selecting new software to download. The process is a breeze. But does Victor understand the models that make this software "free"? Does he understand that he pays for it with personal data, collected surreptitiously? Nope. His mastery of the app store remains superficial.

In 2015, Mozilla conducted web literacy research in Chicago to better understand how individuals engage with the web.¹ The study revealed that applications like SnapChat can amplify some of the web's best qualities, like free expression and instant connection. "Snapchat has lowered the bar for content creation," researchers observed. "It is a new form of ephemeral and ongoing conversation, allowing youth to maintain constant

connection with their friends.” But users barely even recognize that they are subject to SnapChat’s rules and limitations.

Teenagers use social networking apps almost exclusively, and therefore, they don’t know that they are missing out on the wider web’s breadth. There are no thickets of hyperlinks, no galaxies of websites, no freedoms to hack and customize, no opportunities to learn snippets of HTML and CSS. That is because the skills they would need to take advantage of the web—to move beyond the borders of familiar apps—remain largely absent from traditional classroom settings. “Few activities cover subjects that matter to teenagers, like YouTube or Snapchat,” researchers note. “As a result, few activities encourage students to think critically about the tools they use.”

Worse still, what little web literacy curriculum does exist can sometimes provoke fear and anxiety. “Most digital citizenship learning environments focus on the dangers of the web,” researchers report. “While these are important, they do not cover the positive aspects of being a web citizen. Teenagers learn about security, but they do not grasp the bigger global web, trapping them inside the ‘Instagram bubble.’”

For first-time internet users in the global south—where internet access has historically been scarce—barriers to access are now crumbling. Cheap smartphones and evolving telecom infrastructure connect more and more people. From Nairobi to Kolkata to Jakarta, billions more people are discovering the web. Access is essential—but it is only an entry point. It needs to be coupled with sustained adequate education in web literacy. Otherwise, the consequences are dire.

Mozilla recently concluded a 12-month research project exploring this issue. With support from the Bill & Melinda Gates Foundation, we constructed a Digital Skills Observatory (DSO) spanning seven Kenyan cities.² It assessed how low-income, first-time smartphone users experience the web, unpacking the relationship between digital skills, social structures, and economic factors. Not surprisingly, we discovered that internet access without web literacy can worsen existing economic and social woes.

For example, our researchers met Evans in Nairobi. Lacking steady employment, Evans seeks small jobs each day, often putting his earnings toward online betting. This habit has garnered him a television and sound system, but also outstanding debts to digital financial service providers



like M-Shwari. Evans doesn't worry. He believes the companies that lend him money are well-off enough to shrug off his debts. Without a grasp of digital financial services, access has exacerbated his debt and deepened his gambling problems.

Then there's Esther, a Mombasa water seller. Esther inquired about an app she discovered on the Play Store—it purported to diagnose HIV.³ The app randomly displayed a diagnosis after “scanning” a user's fingerprint. It's a foul prank—and for someone without web literacy training, frighteningly convincing. Without a grasp of digital media, access opened Esther up to scams, frauds, and misinformation.

Real-world stories like these were common throughout the DSO research. Individuals engage with small sections of the internet and experiencing its nadir. The newly connected, without web literacy training, find a web that's closed, centralized, commercialized, and confounding. It is dominated by just a few entities like Google, Facebook, and Safaricom, who control access to apps and communication channels. Moreover, it is broadcast, rather than participatory in nature—content is consumed, rather than created, preventing new digital citizens from shaping the web with their own languages and ideas.

The stories of Victor, Esther, and Evans all paint a dismal picture of our ability to teach vital digital skills. But Mozilla's research, and research by the broader network of NGOs and educators working toward universal web literacy, has also uncovered bright spots.

BUILDING TOWARDS FLUID DIGITAL COMPREHENSION

There has been impressive progress mapping the fundamentals of web literacy. Mozilla crafted the Web Literacy Map, an interactive framework for 21st century skills. The map parses digital skills into three categories: Read (searching, synthesizing, and evaluating content online); Write (designing, coding and remixing content online); and Participate (understanding privacy and security basics).

Cultivating these fundamental skills will help move a learner from basic building block techniques to fluid comprehension. Built on traditional literacy principles, it goes from the reader to the word, to the word to the world, and eventually, the reader to the world. The map is grounded in

prior research like the American Library Association's 2011 (ALA) Digital Literacy definition, the International Society for Technology in Education (ISTE) 2016 Standards for Students and the United Nations Educational, Scientific and Cultural Organization's 2013 Global Media and Information Literacy (UNESCO MIL) Framework.

Educators, both formal and informal, are also at work crafting inquiry-centric web literacy curricula, in the form of open-source and hands-on activities. Educators swap and remix activities like HTML Puzzle Boxes (created in Indonesia, and useful for teaching HTML basics), Web Chef (for teaching the principle of remixing online) and Thimble (for understanding the building blocks of code). As open-source creations, the same people who use them every day build these tools. For example, more than 300 contributors from dozens of countries built Thimble, which has also been localized into 33 languages.

Furthermore, initiatives like Open Badges provide a way for learners to document their web literacy achievements and competencies. Badges exist in a trustworthy and open-source ecosystem, allowing anyone with an internet connection to showcase their skills. Thousands of organizations—from NASA and the NYC Department of Education to Peer to Peer University and Universidade Federal de Goiás—are active in the Open Badges ecosystem, which is stewarded by IMS Global Learning Consortium, LRNG, and Mozilla.

Another bright spot is the potential for informal and extracurricular educational activities to teach web literacy. Libraries, community centers, independent mentors, organizations, and individuals all have the potential to help develop people's critical digital skills. In Chicago, we interviewed Linda, who runs an afterschool program that teaches youngsters how to blog; we met George, who runs workshops that deploy Makey Makey kits (hackable circuit boards) and Scratch (MIT Media Lab's tool for creating online); and we spoke with James, a teacher who covers robotics, game design and general online life in his after-school program.

Chicago is also home to Hive Chicago, an award-winning, peer-learning network with a focus on youth-serving organizations. Local libraries and universities seek new ways to teach web literacy through interest-driven, hands-on sessions digital workshops; targeted grants program; and the collaborative production of beta tools and applications.

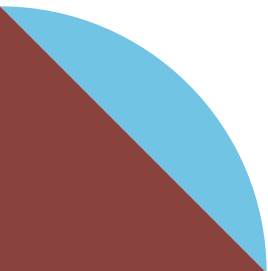
In Kenya, we witnessed innovative and successful methods for teaching



web literacy, like in-person community workshops led by local experts, and chatbots. These workshops and tools are built on trust, empathy, and local expertise, and impart essential skills like managing data usage, recognizing scams, resetting passwords and managing browser settings.

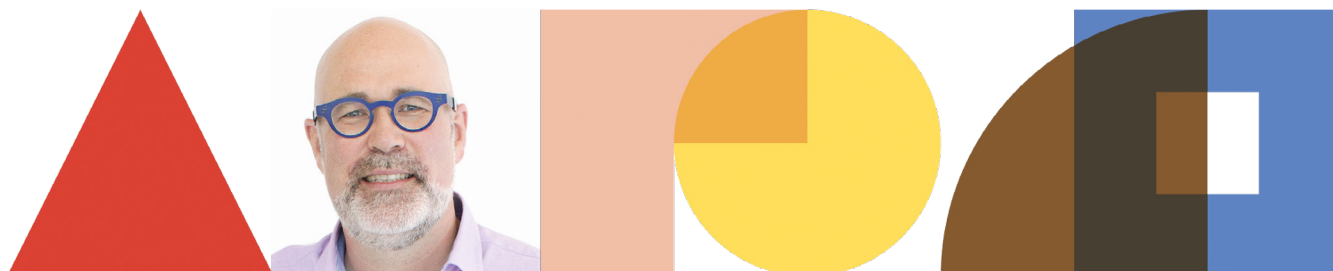
Organizations like U.N. Women are investing in this approach, training and empowering local educators and technologists who can serve as catalysts for web literacy.⁴ Local teaching capacity can be grown and developed exponentially.

These solutions aren't simple to implement or scale. But universal web literacy is an ambitious vision—so we need ambitious solutions. We need to invest in, and grow, the movement to teach web literacy. The more we recognize web literacy as the fourth “R,” the sooner we can move billions farther, faster. And while web literacy is not the silver bullet for 21st century learning at scale, without it, the chances of attaining equity in learning are certainly out of reach.



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Mark Surman

Executive Director, Mozilla Foundation

Mark Surman is Executive Director of Mozilla, a global community that does everything from making Firefox to taking stands on issues like privacy and net neutrality. Mark's main job is to build the movement side of Mozilla, rallying the citizens of the web, building alliances with like-minded organizations and leaders, and growing the internet health movement.

Previously, Mark was the founding Director of telecentre.org, a \$26M initiative connecting community technology centers in more than 30 countries. In the year before he joined Mozilla, Mark was awarded the prestigious Shuttleworth Foundation fellowship, where he explored how to apply open source approaches to philanthropy.



Meghan McDermott

Senior Lead, Mozilla Foundation

For 20+ years, Meghan McDermott has been a key supporter of young people's positive development through digital media, technology, and the arts. Currently, Meghan serves as the Senior Lead for Mozilla Foundation's Learning Portfolio, which include Hives -- city-based peer learning networks dedicated to exploring, creating and sharing digital and web literacy practices. From 2003-2013 Meghan was the Executive Director of Global Action Project, an award-winning youth media arts organization. Prior to that, Meghan was a researcher with the EDC Center for Children & Technology. Her masters degree is from the Harvard Graduate School of Education.

Essay 14

Sharing the Future by Building Better Education Systems

Julia Gillard

Distinguished Fellow, Center for Universal Education at Brookings
Chair, Global Partnership for Education



William Gibson, the lauded science fiction novelist, is credited with the saying: “The future is already here. It’s just not evenly distributed yet.”

Like far too many other profound and attributed quotes, no one seems to be able to pin down whether Gibson actually said it. But, whatever the source, these are important words to keep in mind as we search for meaningful education in uncertain times. Armed with neurological research, innovative educational practice, and high-tech wizardry, a key risk is we design an educational approach of huge sophistication that creates a new future for some while many millions are left behind.

Locking in that educational unfairness would then cause a cascade of other inequalities. Already some 40 percent of employers globally are finding it difficult to recruit people with the skills they need.¹ If education in much of the world fails to keep up with the changing demand for skills, if it remains behind 21st century standards, then there will be a major shortage of skilled workers in both developing and developed economies, as well as large surpluses of workers with poor skills.²

This mismatch between the demand for skilled labor and its supply will lead to growing inequity.³ Indeed, the growing skills gap will prevent the world from reaching the most fundamental of all development goals: Ending extreme poverty.⁴

Avoiding that future requires working out how to deliver meaningful 21st century education at scale in some of the poorest parts of the world. It can only be done if whole education systems are dramatically improved.

Fortunately, the world is not starting from scratch in addressing this challenge. One example, from Ghana, helps paint the picture of what is already underway. In 2012, the Government of Ghana unveiled its Education Strategic Plan (ESP), a 10-year blueprint of how the country aimed to educate its citizens.





Brimming with data, statistics, and technical language, Ghana's two-volume ESP is based on in-depth analysis of the country's education landscape and best practices from similar environments around the world. It spells out in detail how the country would get more of its children to go to school and learn. Among other goals, the plan calls for narrowing the gap between the number of girls and boys who receive and complete their schooling, enabling more children to transition from primary to lower secondary school, improving the quality of teaching and learning materials, and professionalizing the management and delivery of education.

Ghana's latest ESP stands on the shoulders of four previous plans, which have produced, especially over the last two decades, impressive results: Dramatic increases in school enrollment at the primary and secondary levels—among girls and boys—and in the proportion of those who complete school.

Much of that progress is a direct consequence of the Ghanaian government's strong commitments to education and the steady increase of its investment in education. The government's devotion to planning, monitoring, and delivering of basic education services—especially in economically deprived districts across the country—is fundamental to the progress the country continues to make.

Ghana's success is also based on support from external partners, notably GPE, the Global Partnership for Education (whose board I chair), which has provided the country with \$94.5 million in funding since 2005. GPE has been instrumental in helping Ghana strengthen its education system with a strong focus on equity. Indeed, only strong education systems can ensure the most disadvantaged children are able to complete their education.

SYSTEM STRENGTH MATTERS

It would be easy—but misleading—to conclude that the substantial domestic and external funding over the last decade and a half has made all the difference in Ghana's educational progress. No doubt, funding is essential, and countries like Ghana will need more of it if we are to come close to the Sustainable Development Goal of ensuring an inclusive and quality education for all the world's children by 2030. But money is only part of the equation.

Of equal importance is how well each country creates and implements a comprehensive education system that reaches all its children and which will endure for generations to come. That is why those of us who work every day on global education have to focus on the importance of systems. Learning improves when countries like Ghana commit to building education systems over the long term.

In fact, according to an analysis by the International Commission on Financing Global Education Opportunity (or the Education Commission), on which I serve, countries with better education systems—even some with relatively small pools of money to spend—achieve better learning outcomes than others with less effective systems. The Education Commission's review of data compiled by the World Bank's SABER initiative (or Systems Approach for Better Education Results) showed that a strong education system in a middle-income country can produce results as good as those in higher-income countries with weaker education systems.

Even poor countries, the Education Commission found, can produce students who perform as well as students in high-income countries. Vietnam, for example, spends about the same amount per pupil on education as Tunisia, as a percentage of per capita GDP. The Commission notes that in Tunisia only 64 percent of students passed the secondary international learning assessment, while in Vietnam 96 percent did.⁵

Not coincidentally, the Government of Vietnam has been tenacious about creating a strong, well-functioning education system. Since 2008, Vietnam not only spent 20 percent of its own domestic budget on education, it has also produced and implemented strategic plans that commit to consistent, long-term education strategies, expanding high-quality, universal education and teacher-training programs, and conducting relevant research.⁶

The Education Commission also notes that educational performance disparities within countries often arise because education systems in some regions are stronger than others. In Pakistan, for example, the districts of Gujranwala, Bahawalpur, and Khanewal spend approximately the same level of funding per child, but learning outcomes across the three districts differ widely.⁷



ELEMENTS OF A GOOD SYSTEM

Good education systems are made up of a range of elements, including, for example, those that guide development (political and civic leaders); analyze data about progress (information analysis); deliver knowledge and sustenance (school administrators, teachers, books, and curricular materials); constantly seek ways to improve (innovations); ensure everyone is served (inclusion and equity); and keep it nourished (with financing and other resources).⁸

Systems approaches are important because they ensure that the delivery of quality education is equitable and consistent throughout a country and across many different regions, cultures, and income levels. It requires aligning contributions from thousands of teachers, school leaders, communities, and other service providers. If children have classrooms but no books, or teachers with a poor curriculum, their opportunities to learn are weakened. A systems approach focuses on getting the right resources to the right places with the right combination—and making sure, in particular, that those services reach the most disadvantaged and marginalized.

In other words, the strength of any education system depends not only on how well a country executes each of these attributes individually but also on the extent to which it manages the interplay among them paying very close attention to equity. Like any good orchestra conductor, governments must get a diverse collection of instruments, each playing its own notes, to produce a sound of coherent splendor.

GPE'S SUPPORT FOR SYSTEMS

Strengthening education systems matters, and that's why it is at the heart of GPE's approach, which includes three main components:

First, *sector planning*. GPE is the single largest international funder of education sector analysis and planning processes. It provides countries up to \$500,000 to look closely and analytically at what is happening—or not happening—in their education sector and come up with detailed plans based on that information.

Each plan is unique because each country's educational challenges and opportunities are unique. But, through GPE, countries have access to a range of policies and initiatives that have been proven or show promise

in similar settings around the world. Education plans operate as “cases for investment,” around which countries can raise additional financing to scale programs.

Second, *mutual accountability and inclusive policy dialogue*. GPE requires governments and their partners to convene multi-stakeholder local education groups, enabling all relevant players in a country’s education community to contribute throughout the policymaking cycle—from analysis to planning, and to the monitoring of plan implementation.

GPE also encourages governments to conduct an annual joint review of national education progress. Indeed, GPE is the largest funder of national civil society coalitions, which provide essential oversight of service delivery, through budget and policy tracking. GPE also invests in improving the capacity of teachers’ organizations to play stronger roles as advocates and problem solvers that can achieve quality education outcomes.

Third, *results-focused implementation financing*. GPE not only funds education planning, but also the implementation of those plans. GPE grants incentivize countries to focus efforts to drive results, offering one-third of each grant allocation for improvements in equity, learning, and efficiency.

GPE also requires governments to make increased investments from their own domestic funding—ideally, 20 percent of the national education budget (with significant concentration on basic education)—and improve data systems for better monitoring and accountability. And GPE allocations target low- and lower middle-income countries with high numbers of out-of-school children at primary and lower secondary levels. More than half of GPE grants flow to countries affected by fragility and conflict.

In Ghana, a key element of GPE’s support was to empower districts and schools to plan and prioritize their needs—a core element of a strong system. Knowing what is needed at the central level can lead to more regular, predictable levels of funding for districts, which in turn ensures consistently good teaching that will drive better learning. Grants from GPE also deepen community and stakeholder engagement in school management, which enhances the accountability of systems, and improves school leadership and record keeping.

No discussion about the importance of education systems would be complete without an acknowledgment that building and sustaining a good system requires patience and persistence. Ghana’s decades-long



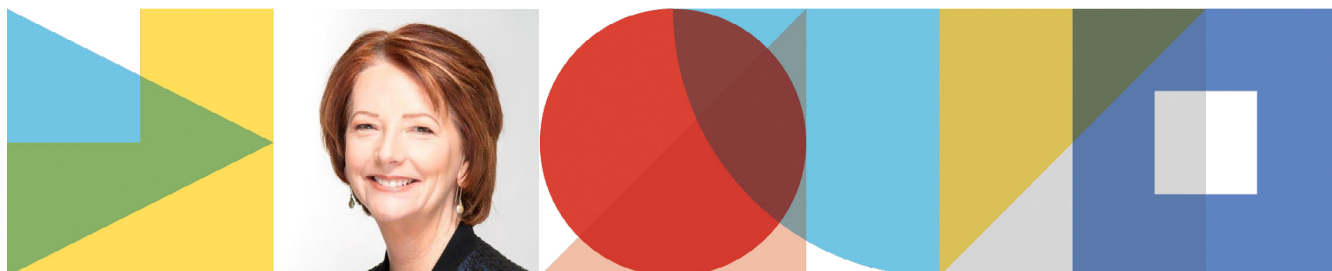
planning, for example, has put educational performance on a steady upward path. But challenges remain. A portion of Ghana's children remain difficult to enroll in school. The country still faces poor learning outcomes in early grades and inequities when it comes to getting students in school. However, it has made progress in recent years in stemming a higher-than-acceptable rate of teacher absences in some areas.

Still, because it has made the effort to understand and respond to its changing educational landscape, Ghana—like so many other countries that have committed to building strong education systems—is in a far more fortunate position to succeed.

Providing the best of educational thought and adequate resources to this kind of systems strengthening is the only way of ensuring a shared 21st century future.

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Julia Gillard

Distinguished Fellow, Center for Universal Education at Brookings
Chair of the Board of Directors, Global Partnership for Education

Julia Gillard was sworn in as the 27th Prime Minister of Australia on 24 June 2010 and served in that office until June 2013.

As Prime Minister and in her previous role as Deputy Prime Minister, Ms Gillard was central to the successful management of Australia's economy, the 12th biggest economy in the world, during the Global Financial Crisis and as Australia positioned to seize the benefits of Asia's rise. Ms Gillard developed Australia's guiding policy paper, Australia in the Asian Century. Ms Gillard delivered nation-changing policies including reforming Australia education at every level from early childhood to university education, creating an emissions trading scheme, improving the provision and sustainability of health care, aged care and dental care, commencing the nation's first ever national scheme to care for people with disabilities and restructuring the telecommunications sector as well as advancing a national broadband network. In foreign policy, Ms Gillard strengthened Australia's alliance with the United States, secured stronger architecture for the relationship with China, upgraded Australia's ties with India, and deepened ties with Japan, Indonesia and South Korea. Ms Gillard has represented Australia at the G20, including winning Australia's right to host the 2014 meeting, the East Asia Summit, APEC, NATO-ISAF and chaired CHOGM. Under Ms Gillard's leadership, Australia was elected to serve on the United Nations Security Council.

Ms Gillard is the first woman to ever serve as Australia's Prime Minister or Deputy Prime Minister. In October 2012, Ms Gillard received worldwide attention for her speech in Parliament on the treatment of women in professional and public life.

Ms Gillard is a non-resident Distinguished Senior Fellow with the Center for Universal Education at the Brookings Institution in Washington. In February 2014, Ms Gillard was appointed chair of the Global Partnership for Education, a leading organization dedicated

to expanding access and quality education worldwide. Ms Gillard also serves as Patron of Camfed, the Campaign for Female Education, which tackles poverty and inequality by supporting girls to go to school and succeed, and empowering young women to step up as leaders of change.

In February 2015, Ms Gillard was appointed Chancellor of Deakin, an Australian-based online education provider offering courses in business and management. Ms Gillard also serves as an Honorary Professor at the University of Adelaide, and is Patron of the John Curtin Prime Ministerial Library in Perth, Western Australia. Ms Gillard is a member of the board of directors of Beyond Blue, which is committed to helping Australians understand and manage anxiety and depression. Ms Gillard is Patron of the Layne Beachley Aim For The Stars Foundation, which supports girls and women to invest in their future to fulfill their potential. Ms Gillard serves on the Board of Governors of the Committee for the Economic Development of Australia.

In recognition of her public service, Ms Gillard was awarded a Companion in the Order of Australia in January 2017.

Ms Gillard's memoirs, *My Story*, were published by Random House in September 2014. The second edition of her book was published in July 2015.

Essay 15

Breaking Down the Barriers

Integrating the School and
Beyond in Education

Rohan Sandhu

Senior Engagement Manager, International Innovation Corps (IIC)



Few cases more effectively demonstrate the need to engage parents and communities in the education system than the education of girls.

In contexts where over 80 percent parents expect their daughters to become housewives or whatever their future in-laws would like them to do,¹ engaging parents and communities and addressing deep-seated societal norms has been critical in meeting the Millennium Development Goal of increasing access to education for all children.^{2,3}

As Urvashi Sahni, Founder and Director of the Study Hall Foundation that runs the Prerna School, for girls from economically poor backgrounds in Lucknow, India, writes, “Teachers become strong advocates for girls’ rights with the parent community. They leave no opportunity to educate the parent community about girls’ rights.” Based on her experience with Prerna, Sahni recommends that schools deal with social barriers head-on; teachers often need to take on an activist role and intervene when girls do not attend school, counsel parents, and enlist the support of local NGOs.

Parental and community engagement is crucial not only to bring students—especially those marginalized—into the school system, but also to make sure they stay and learn. Beyond issues of access and retention, research finds that communities play a positive role in improving school infrastructure and governance—especially reducing teacher absenteeism. There are also several cases on how parental involvement has facilitated improvements in learning. A longitudinal study of learning outcomes in 100 Chicago Public Schools identified ties with parents and communities as one of five critical factors that led to improvements in reading and math over a seven-year period.⁴ Similarly, an evaluation⁵ of a parent empowerment program in rural Mexico found improvements in intermediate school outcomes, including a reduction in primary school grade repetition and failure.



ENGAGING PARENTS IN THE SCHOOL SYSTEM

As global education policy has become aware of the need to engage parents and communities, countries have responded by creating various enabling institutional mechanisms. Following global examples of decentralized school-based management through the empowerment of parents and communities, India's Right to Education Act (2009) seeks to bring all children into the school system and mandates the creation of School Management Committees (SMCs) in all government schools. SMCs are responsible for monitoring school functioning, overseeing grant utilization, increasing enrollment and retention, and creating school development plans for improvements in school infrastructure. There has been a similar focus on organizing Parent-Teacher Meetings (PTMs) at frequent intervals, with a push to increase parents' attendance at these meetings.

However, these institutional mechanisms face significant constraints that prevent them from being effective. An analysis of SMCs by the Centre for Budget and Policy Studies⁶ across five Indian states found that SMC members were largely unaware of their roles and powers. Furthermore, only about 20 percent of members had received some training, and even the majority of those trained rated the training ineffective. Across the country, training and capacity building of SMCs has been inadequate, with limited follow up and support.

Studies from around the world find that information gaps among parents and bodies like SMCs prevent them from playing their intended role. Parents, especially those of first-generation learners, remain unaware of their role in ensuring effective schooling, and information about their children's learning outcomes and needs is rarely communicated in ways that they can comprehend or respond to. This makes forums such as PTMs exercises in futility. As Prachi Windlass of the Michael and Susan Dell Foundation writes, this lack of information ultimately silences parents and prevents them from being the influential agents of change they can be.⁷

New technology-driven solutions and data provide avenues for keeping parents informed. However, the problem isn't the access to information—it is the inability and lack of capacity to use it effectively. For parents to be active users of data, it is critical that they are not supplied information in a top-down manner, but are instead agents in its collection and authentication. One model example is Pratham's Village Report Cards experiment, where report cards were created at the hamlet-level with wide local participation. Their involvement in the data collection process was

followed by discussions in village meetings and eventually led to community action through active engagement with the school system.

There are no quick fixes, though, and while the aforementioned institutional mechanisms provide a good starting point to understand the constraints parents and communities face in being effective agents of change in the school system, it is also crucial to recognise that these are by no means the silver bullets in addressing the need for parental and community engagement.

INADEQUACIES OF EXISTING INSTITUTIONAL MECHANISMS

The aforementioned institutional mechanisms can only be as successful as the autonomy they're allowed to have and the change they're able to influence. While on paper, SMCs in India are responsible for monitoring how school grants are utilized and for creating school development plans, in reality, they were found to have the discretion to spend less than 2 per cent of the total money that schools receive in a year.⁸

The World Bank,⁹ studying school systems across South Asia, finds that the decisions—ranging from teacher recruitment and training to curricula and textbooks—that might have an impact on school quality rarely fall within the purview of individual schools themselves. With entities allocating resources and making decisions at a level much higher than the school system, SMCs are eventually toothless in ensuring the effectiveness of teachers and other school-level resources. For school management to happen in a decentralized manner, it is not enough to focus just on the demand side. The supply side, schools, must have the ability to respond to this demand, and unless, governance structures are reformed, any measures that claim to empower communities and parents will remain tokenistic.

It is critical that we also study how these institutional mechanisms actually “empower” parents and communities. Bodies like SMCs and PTAs must contend with profound challenges, mirroring as they do the larger hierarchies and structures in society. There is overwhelming evidence across Africa and South Asia that points to how the socioeconomic and cultural backgrounds of families posit them at different levels and allow them to take advantage of the education system towards their own interests and benefit. These forums are captured by local elites and are subject to the



larger social, economic, racial, and gender inequalities in society.

In line with this, the CBPS survey finds that even though the marginalized and weaker sections of society were represented in SMCs, their presence did not translate into active participation, and that there was a visible power dynamic between men and women, due to which women were unable to participate effectively.

All of these factors, coupled with a cascade model of training that fails to be cognizant of the heterogeneity of SMCs or the parent constituency more generally, prevents them from being truly participatory. Far from realizing the Sustainable Development Goal of ensuring inclusive and equitable education, this instead ends up perpetuating the inequalities in access to quality education. We have made rapid strides in utilizing granular data to inform political campaigns and identify and target social programs—this infrastructure may also be leveraged towards targeted training, communications, and messaging to address the specific concerns and constraints of parents from diverse socioeconomic and cultural backgrounds.

At a much more fundamental level, though, we need to reframe the larger conversation on parental engagement. Far too often, parents and communities are seen as regulators or watchdogs of the school system. Such a framing seldom fosters constructive interactions between schools and parents, and in fact, curtails the motivation of teachers and school leadership in promoting parental engagement.

Research finds that for parental engagement to be effective, parents and the school system must see themselves as partners. They must also share a relationship of mutual respect, trust, and be bound by a unity of purpose.¹⁰ There is also evidence that increased involvement in schools allows parents to develop a more positive attitude towards teachers.¹¹ It is crucial that such evidence is widely disseminated and that schools and teachers are actively trained—and reminded of their own incentives—to engage parents.

ENGAGING PARENTS BEYOND THE “SCHOOL SYSTEM”

As we think of parents as partners in the education system, it is also important that we broaden our conversation from how parents can engage

with the “school system,” to how they can engage with their children’s learning and education.

While we have increased access to formal education over the past two decades, we have also begun to assume that education happens only within the compounds of a school. SMCs and PTAs serve as vehicles that enable engagement with the school system, but should not cannibalize conversations about engaging the parent constituency more broadly and comprehensively.

It is essential that we go back to the basics, and embed the conversation on children’s learning and academic performance in the fundamental socioeconomic factors they are exposed to at home and in their communities. One study found that early childhood stunting and poverty levels have an impact on children’s cognitive abilities and academic performance, causing them to do poorly in school.¹² As a consequence of this, the authors estimate that over 200 million children under the age of 5 are unable to fulfill their developmental potential.

This makes it imperative that we address parents and communities in a more holistic manner, with the recognition that education policy cannot work in isolation from social policy. In line with this, Brazil’s Early Childhood Development Support program—predicated on the belief that the parents’ role is the “principal determinant in child development”—brings together the Departments of Education, Health, and Social Development to coordinate home visits to parents, to promote all-round development of children.¹³

To prepare children to be successful citizens in the 21st Century, there is an urgent need to emphasize a broader set of skills and find ways to leapfrog education innovations. The World Economic Forum’s Future of Jobs Report¹⁴ lists skills such as problem solving, creativity, critical thinking, and ability to coordinate and work with others, among the top 10 skills in demand for the future. The Center for Universal Education at Brookings surveyed the educational mission statements and priorities of about 100 countries and found that more than 86 percent lay emphasis on 21st Century Skills such as communication, problem solving, and collaboration.¹⁵

When we think of education only in terms of literacy and numeracy skills, we inevitably erect barriers that keep out parents who can’t contribute in these areas, create a hierarchical relationship between the teacher and



the parent, and reinforce the socioeconomic inequalities between parents who have different capacities owing to their backgrounds.

The new emphasis on a broader set of skills provides a valuable opportunity to redefine these relations, recognize that learning can happen anywhere and the teacher is far from the only person who can allow children to cultivate the skills they need to be active citizens in a changing world. Skills like collaboration and communication, and creativity and problem solving, are far from the purview of just the school system—they may well be taught in theory in classrooms, but need to be practiced and honed at home and in society. Children need an extended time and space for learning, and unless we empower and train more agents outside the school system to serve as mentors and guides, we will fail to successfully equip students with the skills they need to be successful.

Ultimately, the jury is still out, with evaluations around the world yielding differing results, on whether parental and community involvement in schools leads to increases in learning outcomes. But we should be reasonably confident that parents have a unique role in the education of their children—as consumers and suppliers. Furthermore, as we devise mechanisms to translate the policy focus on 21st Century Skills to actual changes on the ground, a new parent-teacher partnership might just be the leapfrog opportunity that we've been looking for.

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Rohan Sandhu is Senior Engagement Manager at the International Innovation Corps (IIC), a social impact consulting program based at the University of Chicago. At the IIC, Rohan leads teams working on-site with governments and foundations to implement large-scale projects in the area of economic and social development, including education, healthcare, agriculture, and water and sanitation. Rohan has been part of four education projects – including government-led systemic interventions in the states of Rajasthan, Haryana, and Himachal Pradesh, and an educational innovations project with start-ups based in Delhi. Prior to the IIC, Rohan was a part of the founding team of the Brookings Institution's India Center, where he conducted research in the areas of economic development and political economy, and led the organization's communications and development strategy. Along with the Director of Research of Brookings India, he is one of the editors and lead authors of *Accelerating Access to Quality Education*, published in 2015. Rohan has also worked as Chief of Staff to a Member of Parliament in India; as Macroeconomics Research Fellow with the Finance Department of the state of Andhra Pradesh, India; and with the City of Chicago.

Essay 16

Look Before You Leap....Frog

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Leapfrog, it conjures images of the joyful childhood game.

At its best, players propel themselves forward, skipping over the place of others and landing on solid footing. As a strategy for education development, leapfrogging implies strategic advancement especially for developing countries that avoid 20th century pitfalls such as inefficiency and inequality that developed countries encountered. But the desire to skip the small incremental advancement comes with considerable risk of landing on weak footing without preparation for the unknown future. Global development experts should look ahead to where accelerated education development will take these societies and anticipate quickly appearing social challenges from wide-spread education, and then assist to the degree that they can in preparing for these.

Supplying quality formal education for all children and youth is key to achieve social, democratic, and economic development across the world. Universal education is an urgent global mission for impoverished regions. Particularly now that so many nations are a fully “schooled society” reaping the benefits of extensive educational development. The schooled society holds much promise, but as with every large-scale human endeavor, it comes with consequences leading to future challenges that are often under-anticipated and for which we are ill-prepared to manage.

From a wide range of technical sociological, epidemiological, demographic, and political studies, we now know that along with invaluable human capital accumulation and other positive transformations from education development comes a new type of society with unique social problems. Education attainment is not just a relative status placed upon the individual or merely imparts narrow skills, it leaves an indelible absolute effect on the whole person. More schooling changes people in fundamental ways, even up through tertiary levels. Thus, with larger cohorts of educationally transformed people societies change, and we now know the changes happen much faster than originally assumed, perhaps particularly so from leapfrogging strategies of educational development.¹

Just a few examples illustrate the challenges of what will rapidly come along with all the benefits of universal education. Net of economic development, educated populations are healthier ones, certainly a positive, but with this comes rapidly rising longevity with high rates of expensive chronic disease burdens and other dependency costs from greying populations. We also know that supplying formal education is the key factor in reducing high fertility rates, but within just one generation, it can also lead to plummeting sub-replacement levels and the challenges of shrinking societies. At the same time, the educated within populations are frequently the first to adopt and normalize the use of new products and lifestyles that ultimately have significant health risks for the whole population, such as occurs with new tobacco products, new illicit drugs, food trends, new sedentary occupations, and so forth. Also, the educated are more politically active but not necessarily more moderate or uniformly ideological, which can lead to greater divisive political conflicts. And the list goes on.

Again, educational development is crucial for the collective good of humans everywhere. Ours is not a plea for deschooling or for some rationing scheme, which are impossible anyway given the inexorable demand for education, not to mention that both would be socially unjust and ultimately dangerous to the social contract. Instead, along with leapfrogging education, we should project forward to see where a rapidly built schooled society would take the people living within it, and help think through how earlier warning about the resulting challenges could serve to lessen their impact.

One likely challenging consequence from rapid educational development that both of us have examined is how new forms of pernicious social inequality arise from otherwise noble attempts to provide as much equality of educational opportunity as possible. Expanding access to education, even to reasonable levels of quality, is not optimal if there are built-in inequalities that amplify existing disadvantage. This leads to underdevelopment of a population's human capital potential as well as other social problems arising from inequality. Notably, a clear, if at times uneven, phenomenon among the world's most educated nations is the tendency to make access to educational opportunity equal. An obvious example of this on the world stage is the significant campaign for increasing girls' access to schooling. And this general trend is for the good.

But, as national systems of education install more policy aimed at equitable access to educational opportunity, they can unintentionally set off intensifying levels of private investment in educational opportunities by



families. And such private purchasing of additional educational advantage can lead to a kind of “educational arms race” creating new forms of social inequality. As educational development in a nation deepens the centrality of formal education in the labor market, cross-cutting pressures for more equality of public schooling motivates family investment in educational advantages, which can in the extreme form new inequalities.

SOUTH KOREA AS LEAPFROGGING IN THE SECOND HALF OF THE 20TH CENTURY

An informative example of this challenge is what has happened during South Korea’s rapid educational development. With half of its population illiterate and suffering a very low GDP, just sixty years ago this nation would have been a prime candidate for leapfrogging educational development. In fact, in many ways, this is exactly what the nation did with stunning success. South Korea inexpensively developed public education up through higher education at a remarkable pace, all the while building a high performing, accessible, and extremely equitable system; one that has enacted policies that are the envy of most other nations. Yet, at the same time, South Korea experiences among the world’s highest private investments in education by families, an educational arms race many Korean policy analysts fear to be an inexorable nightmare of social inequality.

As a direct result of rapid, efficient, and equitable public education development, South Korean families carry one of the world’s highest levels of private investment in pre-tertiary education; with average expenditure estimated to be 10 percent of family income, a financial burden that increased by about 15 percent from 1990 to 2010, and claims a share of household budgets just behind food, lodging, and debt payments for families with students. Often starting with preschoolers, families spend significantly on various forms of private supplementary education services, including after-school cram schools, one-on-one tutoring, and online services up through secondary schooling. While some services are aimed at peripheral activities, most are for either enrichment or remedial academic performance enhancement and test preparation in the public system. All of this is provided by a flourishing private industry with sophisticated advertising strategies, dynamic e-learning programs, superstar lecturers and tutors, and a widely known and respected status ranking among cram schools. At the same time, the industry, and its cost and consequences, is a central and divisive topic in the intense educa-

tion politics of the country.

Referred to by educational analysts generally as “shadow education,”² this growing global phenomenon is, of course, well known, but it is usually chalked up to a reaction to an over-the-top high-stakes testing regime and a strange cultural legacy.³ What is less known is that neither are the main driving force. Instead, educational development drives shadow education. Over the past 60 years, each time the Korean government established a new level of policy intensifying equitable educational opportunity, often directly aimed at lowering social inequalities, families upped their investment in shadow education. And forms of this dance are occurring across the world. Note the increase in private school use throughout South America as governments there developed fuller access to public schooling. In addition, shadow education is increasing worldwide and not limited to any one cultural style of schooling or testing regime.

It is also clear from the South Korean experience that heavy-handed government policy to ban shadow education will likely backfire. Plus, ironically, the interplay between these two trends does motivate some of the best policy about access and equality to public education.

From a societal point of view, too much investment in shadow education can lead to more harmful inequality. Of course, at the same time, the use of shadow education by parents in low-income nations as a substitute to underdeveloped public schooling is potentially a short-term reasonable strategy, and very understandable. But the Korean problem suggests a more challenging consequence of educational development.

To what degree an educational arms race is an inevitable outcome of educational development, particularly rapid development, is unclear, although right now the best research suggests that it is very likely. The situation is further complicated by the fact that usually the bulk of the families buying shadow education also support equal educational opportunity policy for the good of the whole society. Although there is likely no easy fix, we should not be overly cynical, and some enlightened policy approaches could be developed to limit this likely problem.

As developing countries hope to leapfrog as an advancement strategy, we observe that the possibility of catapulting into the future, skipping over the small incremental steps that characterized the expansion of public systems of education in the 20th century, has tremendous appeal and the possibility of meaningful amelioration. But landings need signif-



icant foresight. At the very least, as we leapfrog into faster expansion of education, and along with all the good it can do, development experts should help prepare national governments and societies for the range of new social challenges that we know will come with a schooled society.

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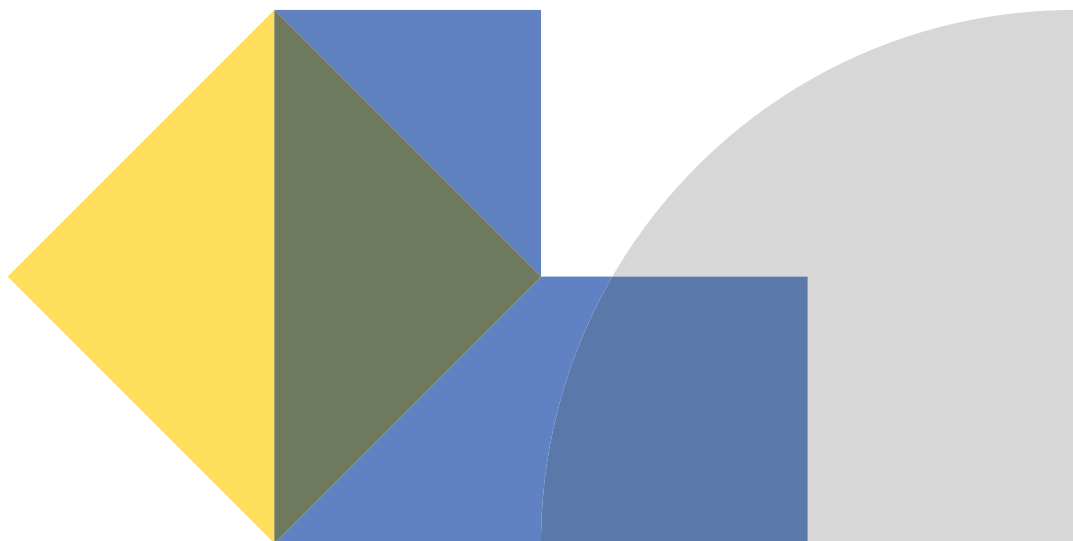
David leads multidisciplinary and international research projects on the impact of the worldwide education revolution including the expansion of higher education in the U.S. and elsewhere. Recent studies are on education's influence on the knowledge society, economy, and global mega science over the 20th century, labor market payoffs from academic degrees and cognitive skills, and population health trends. Baker frequently consults with multilateral organizations and national governments on education policy. His recent book is *The Schooled Society: The Educational Transformation of Global Culture*, Stanford University Press.



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Maryellen's research includes several US and comparative areas such as the intensification of cognitive demands on young children, the cultural significance of education, and the expansion of child rights worldwide. Her latest project is on the expansion of early childhood education. In the US, the proportion of children attending both kindergarten and preschool has steadily risen since the middle of the 20th century and now some states are offering universal preK. But what prompts this expansion of education and is a universal program the most effective and efficient use of our tax dollars? Or are targeted programs to low income children the best way to create equality of educational opportunity?



Essay 17

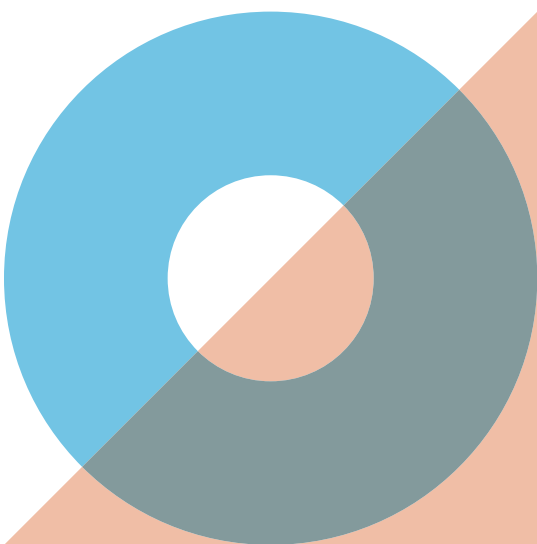
Education System Change

Perspectives from Kenya

Darius Mogaka Ogutu

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My intrigue with the education system dates back more than three decades when I began as a fresh graduate teacher with the aspiration of literally igniting the classroom.

I finally had the license and authority to teach and management entrusted me to groom learners to be “great!” Shortly into the adventure towards greatness, I realized that the process was already pre-determined and I was expected to tinker with classroom interactions within the boundaries of the syllabus. The goal was to cover the syllabus—and any thought of introducing new content was frowned upon. There was no room for knowledge for knowledge’s sake, a teacher was in class to teach and how well one taught was evident through students’ exams. But I wanted to excite the learners, introduce them to new concepts and ideas, make them think, and yearn to know more.

Soon enough, the parents and guardians came to expect more from schools: They had high expectations that school would transform their children. In some cases, they even saw the teacher as a miracle worker of sorts, after all, a teacher could make a child learn. A common assumption was that schooling would shape the children and the teacher would be the one person to ensure this happened. However, things were not as simple and practice was indeed different from the theory covered in university lecture rooms.

It gradually dawned on me that maybe the system would yield different results if it catered to the unique classroom circumstances that the teacher faced. I had come to expect more from the learners, and by extension, I expected to offer more as a teacher. This conviction inadvertently led me on a journey to try to change the way classroom instruction was carried out, through curriculum development and reform. As a researcher and curriculum specialist, I questioned and examined the curriculum and began working to address the concerns raised by teachers, academics, civil society, parents, and learners.



This led to my realization that policymaking was complicated, and any change of the curriculum would require extensive decision-making at a national level. I eventually moved on to become an education officer, joining the national level team of senior government officials responsible for education management and administration. This opened engagements with a wide range of stakeholders: Legislators, field officers, entrepreneurs, parents, employers, industrialists, civil society, faith-based organizations, academics, pastoralists, and development partners. The idea of change resonated, but most efforts had not borne fruit. It was a humbling realization to look back and trace my path from a classroom teacher to a curriculum specialist and now as a senior education officer. All through, the idea was to contribute towards changing the system and make it better for the child, the teacher, and ultimately, the country.

NEW SYSTEM FOR NEW SKILLS

Today, as the Director of Policy, Partnerships, and East African Community Affairs in Kenya's Ministry of Education, I think a lot about how innovation can help our schools. How can new approaches help teachers best serve the unique circumstances they face daily in the classroom? How can the education system best address the needs of a developing economy and propel it the heights of industrialization? I often turn to innovations outside the education sector for inspiration.

I think about M-Pesa, the decade old mobile money transfer service targeted to Kenyans without access to banking services, which has evolved into a key component of not only the Kenyan economy, but the global economy. Mobile money is an innovation that brought change in a local context but has had a global impact. How can we then bring about innovations in the education sector and achieve exceptional systemic impact that benefits entire generations?

Reflections on the education system in Kenya take on the nature of the wider system: Policy and legislative reforms, curriculum reforms, education innovations, skill-based approaches, industry and classroom linkages, acquisition of employable skills, lifelong learning, and the provision of education for the 21st century learner. It is the demand for change that propels education systems to produce a country's innovators, inventors, creators, problem solvers, entrepreneurs, global citizens, changemakers, and critical thinkers.

It has always been the desire of successive governments in Kenya to bring about system reforms in line with national and continental aspirations. At the Africa Union level, member countries have agreed to Agenda 2063, which includes education aspirations to catalyze an education and skills revolution and actively promote science, technology, research, and innovation, with the goal of building knowledge, capabilities, and skills for Africa's future. This is given impetus by the African Union's vision of an integrated, peaceful, and prosperous Africa, driven by its own citizens to take up its rightful place in the global arena. This required pursuing a process of change guided by evidence-based decision-making, supportive legislative frameworks, and resource allocation to the actual teaching and learning process in the classroom.

Sharing strategies and lessons with peers across the continent has always been a source of useful reflection of our work in Kenya. As part of the regional East African Community, peer learning and peer support is always a key component of building on partner states' strengths for enhancing the quality of life for the citizens in the region. For example, as one of the Learning Champion countries engaged with the global Learning Metrics Task Force, I participated in an East African workshop that heavily influenced my thinking. How could we expect our children to develop the full breadth of skills needed to thrive in the 21st century if our national curriculum had not changed in 30 years?

CURRICULUM REFORM AS PART OF WHOLE-SYSTEM CHANGE

Today, Kenya is developing a new curriculum for a new era. The National Policy on Curriculum Reforms is guided by the vision of "Nurturing every learners' potential" and is championed at the highest political levels by the Kenyan Head of State, His Excellency Uhuru Kenyatta and the Cabinet Secretary in charge of Education, Dr. Fred Matiangi. In line with Kenya Vision 2030 and the Constitution of Kenya 2010, the overall aim of the new curriculum is to equip citizens with skills for the 21st century and hinges on the global shift towards education programs that encourage optimal human capital development. Education should be viewed in a holistic spectrum that includes schooling and the co-curriculum activities that nurture, mentor, and mold the child into productive citizens. There is emphasis on the learner's character, patriotism, citizenship, and ability to coexist as a responsible citizen without sectarian inclinations.



The proposed curriculum reforms are a part of system-wide reforms: School-based quality assurance, offering instructional leadership, improving the learning environment, quality and cost-effective teaching materials, standard learning infrastructure, continuous professional development of education officials and teachers, and a drive towards an inclusive education. Additionally, the reforms introduce vocational and technical education early in junior secondary school to encourage attaining dual qualification (i.e. academic and industry) and education as a continuum from Early Childhood Development (ECD) to tertiary level.

A central focus of the reforms is how we approach teaching and learning around the child. This includes place of the teacher and the learner in the change process and whether it is possible to increase trust in the teacher. Therefore, implementing these reforms on the ground will require reviewing teacher training, upgrading teacher training certifications to a minimum of diploma, promoting specialization, strengthening internship/teaching practice, action research, mentorship, community of practice and peer education, and procurement and provision of quality instructional materials.

In order to facilitate the reforms through an evidence-based policy decision-making process, Kenya has piloted several interventions which have scaled up national-wide. For example, based on the Primary Math and Reading (PRIMR) pilot, the roll outs of the Tusome national literacy program and the Primary Education Development (PRIEDE) project have greatly contributed to the evidence in literacy, numeracy, supervision, provision of instructional materials, and teacher support. The purpose is to plan for significant impact from interventions with an eye for enhanced skill acquisition and training for the global economy.

The reform process is expected to produce a flexible curriculum that allows for complementary alternative pathways, which provide learners with choices of specialization and interest. The guiding principles of the Continental Education Strategy for Africa 2016-2025 establish holistic, inclusive, and equitable education as a core for sustainable development the establishment of scientific and technological innovation, creativity, and entrepreneurship.

NEW CORE COMPETENCIES FOR BASIC EDUCATION

To realize this pan-African vision, we have shifted our focus to competencies and skills that reach beyond traditional academics. We are proposing core competencies for basic education that cut across subject areas and expanding subject areas to include essential topics for this century. This is summarized in the table below:

Broad Area	Pertinent and Contemporary Issue
1. Citizenship	Peace education, integrity, ethnic and racial relations, social cohesion, patriotism and good governance, human rights and responsibilities, child's rights, child care and protection, gender issues in education.
2. Health Education	HIV and AIDS Education; alcohol and drug abuse prevention; life style diseases; personal hygiene; preventive health; common communicable and chronic diseases.
3. Life Skills and Values Education	Life skills, values, moral education and human sexuality, etiquette.
4. Education for Sustainable Development	Environmental education, disaster risk reduction, safety and security education (small arms, human trafficking), financial literacy, poverty eradication, countering terrorism, extreme violence, and radicalization.
5. Non-Formal Programs	Guidance services, career guidance, counseling services, peer education, mentorship, learning to live together, clubs and societies, sports and games.
6. Community Service Learning and Parental Engagement	Service learning and community involvement, parental empowerment and engagement.

DON'T FORGET TECHNICAL VOCATIONAL EDUCATION AND TRAINING (TVET)

The reforms and core competencies in basic education are expected to transcend into both TVET and university education levels. Following the Science Technology and Innovation Strategy for Africa (STISA) 2024, whose mission is to “Accelerate Africa's transition to an innovation-led, knowledge-based economy,” Kenya and other countries in Africa, will need to find a nexus between basic education and TVET. The continental Agenda 2063 aims to address youth employment through quality and rel-



evant education that will result in a skills revolution. This will be achieved through rebranding TVET and making career options more appealing and meaningful. We need to make education and training count by responding to labor market needs, equipping youth with competencies in critical thinking and creativity, creating and expanding opportunities for youth re-skilling, and enhancing skills mobility across learning areas. Part of these reforms will entail introducing Vocational and Technical pathways at the secondary level as a way of orienting the learners towards the complementary options that are available at post-secondary level. This may also imply that secondary education through these pathways could lead towards dual qualifications for the learners—thus enhancing the employment opportunities after secondary education.

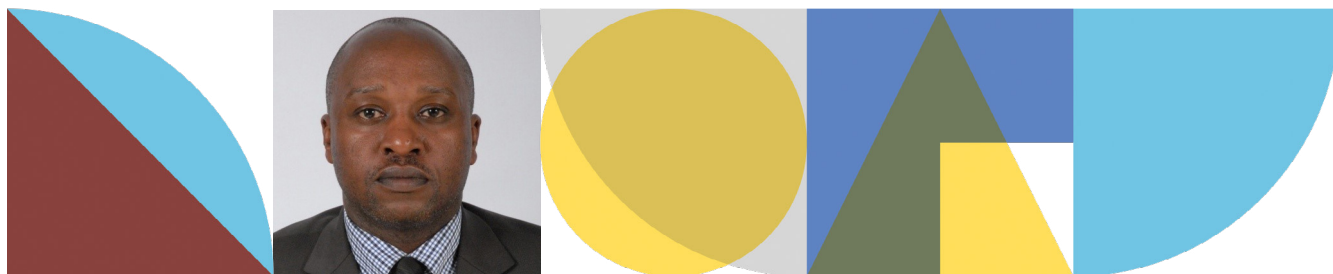
A PUBLIC GOOD FOR THE 21ST CENTURY

Education as a public good aims to provide quality education in order to reduce disparities (education as an equalizer). System change should address aspects of equity and equality as well as the broader quality imperative. To do this, the reform process must be integrated, disruptive, and transformative for there to be tangible results for all learners. It is a complex process that can only be realized through collaborative partnerships between government and other key players, such as parents, civil society, and the private sector. A mindset shift is required to create a new culture of progressive improvement of the status quo and I am heartened by the current momentum and excitement towards education system reforms.

Our hope is that these bold reforms should culminate in a learning environment crafted with the best interests of the learner at heart, the realization of the role of the teachers, tutors, and teacher trainers, the full engagement of government and households on the requisite resource allocation, and the quantum of economic development that we all aspire for.

Sometimes we expect too much from old education system models to deliver modern 21st century skilled learners. But we have no other choice but to pursue these ambitious plans. Kenya, like Africa, has a significantly young population that forms a critical portion of the human workforce. During the ADEA Triennale 2017 in Dakar, Senegal, thought leaders met and shared on how to sustainably prepare and engage the youth in Africa. Dr. Akinwumi Adesina, President of the African Development Bank,

opined that “education is the key that opens up the realization of the objectives of sustainable development.” The youth form the critical mass that is poised to carry Africa through the next African Revolution spurred by education and training.

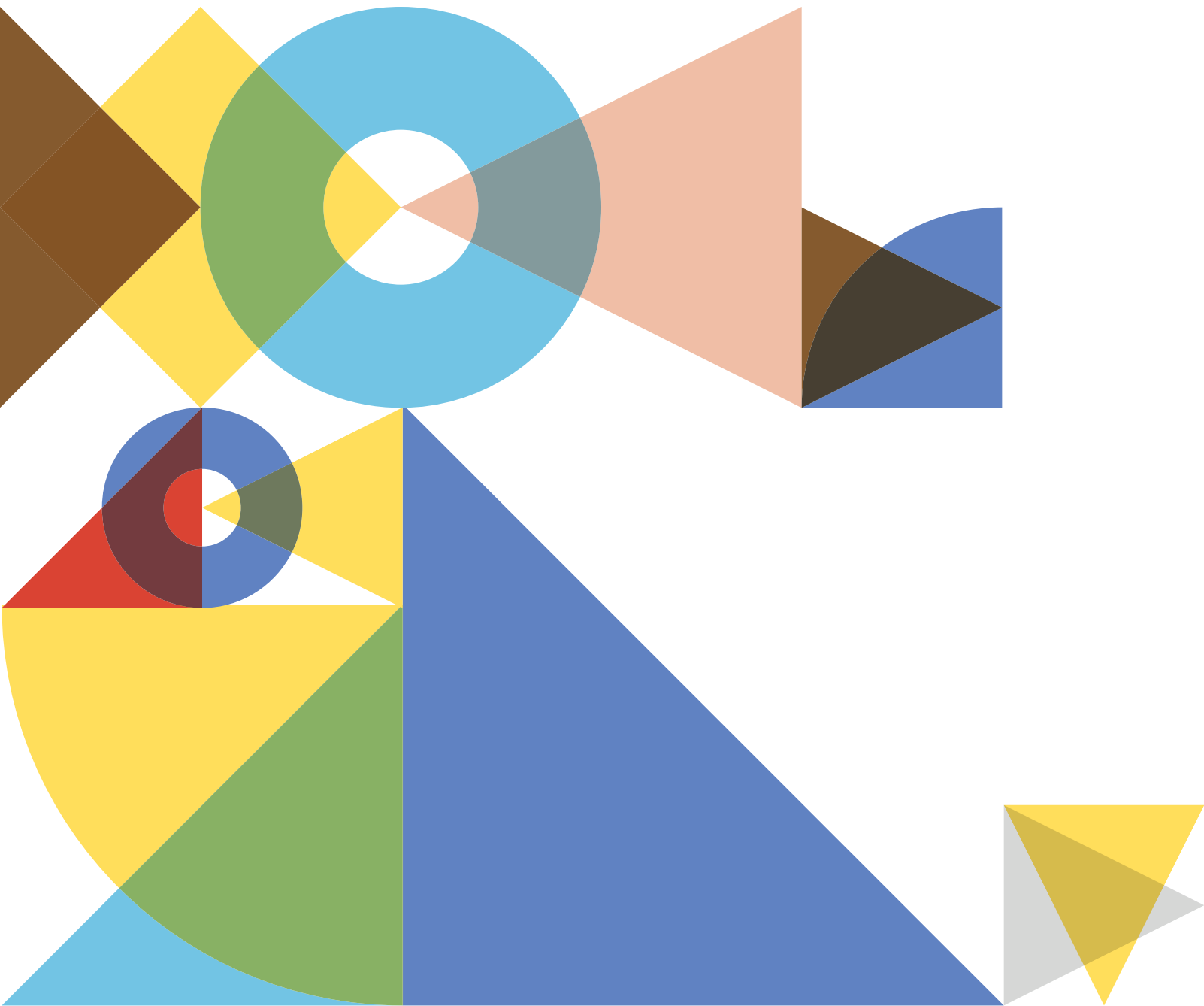


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He is a member of the national steering committee for the following three national programs: USAID and UKAID funded-Tusome Early Grade Reading Activity, GPE funded - Kenya Primary Education Project (which focuses on Early Grade Numeracy, school management and EMIS) and CIFF-funded Tayari Program (which focuses on school readiness at early childhood level). In this role, Mr. Mogaka coordinates policy aspects within these three key national programs which are entrenched in the National Education Sector Plan. He is also a core-team member of the Education Evidence for Action (EE4A).



SKILLS FOR A CHANGING WORLD