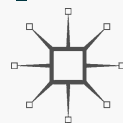




SUSTAINABILITY,
HUMAN WELL-BEING,
&
THE FUTURE
OF EDUCATION

EDITED BY
JUSTIN W. COOK



Sustainability, Human Well-Being,
and the Future of Education

Justin W. Cook
Editor

Sustainability, Human Well-Being, and the Future of Education

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This book is an outcome of just such an exploratory process. Several years ago, Sitra began developing a new societal model organized around sustainability and human well-being. As part of that work, we asked what role education would play in working toward that future. The answers came from many corners of Sitra, of the education community in Finland, from Finnish society itself, and a broader global network of contributors. Without each of their insights, experiences and voices, this book would not have been possible.

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The contributing authors of this book have shown tremendous commitment to this work and I know will continue to carry forward the insights that we have developed together. Their willingness to deeply collaborate and learn together has been inspiring.

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Helsinki, Finland
May 2018

Justin W. Cook

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INTRODUCTION

This book is a response to the situation that many Western societies find themselves in today: digitalization and globalization have made the future, and how future generations will succeed in it, profoundly uncertain. The future is of course, always uncertain. But with a few exceptions (wars, pandemics, etc.) since the nineteenth Century, there has been a reasonable expectation that society and the economy would advance while nature, viewed through the lens of dominion, would remain productive and stable. In other words, that the future was in some way, connected to the past and that each generation would be better off than its forebear. Today, it is hard to point to anything that is stable—the environment included. This volatile and uncertain moment raises questions of purpose for society’s constitutional institutions—even and perhaps especially, education. What is the purpose of education? Should education systems be burdened with sustainability? And how should we determine its purpose? To what end do we learn?

In the West, our education systems have largely been a success. They have helped lift millions to higher levels of social, civil and economic success and thereby contributed to strong nation states and economies. And with success has come a certain degree of trust—and complacency—toward the administrative systems designed to sustain learning at scale. As societies have evolved, we have asked education systems to do many things from career and college readiness to sustainable development as well as many other forms of cultural transmission. But trust has also lead to another feature of our education systems: neglect. Even if it is benign,

neglect has kept education outside of the strategic conversations that shape national goals, priorities and investments. At the highest levels, the education debate is often concerned with its administrative design, rather than what society expects and needs. Education is ring-fenced into an administrative silo where the challenging demands of delivery overpower internal debate about purpose. Sloganeering often characterizes the external debate.

Over its 50-year history, Sitra, the Finnish Innovation Fund has used its public resources to enable societal transformations in Finland. In the 2000s, its attention turned toward sustainability and has since evolved into a strategic focus on sustainable well-being. This book presupposes that societal model worked toward by Sitra and its counterparts will one day be realized, reorganizing society around a new set of principles that empower individuals and communities while balancing the competing demands of society, the economy and the planet. The following chapters seek to explore how individuals, schools and communities can become the building blocks of this future, how learning will need to change and what skills will be best suited to a radically different future. Each chapter takes a significantly different view on these questions. Because the nature of this transformation is so significant, the book is not intended to be comprehensive and the authors are drawn from a wide range of backgrounds and expertise. However, the authors stake out important territory that will feature prominently in humanity's next evolutionary transformation toward sustainability and human well-being.

While this book is an important, singular product of much thinking, collaboration and decades of collective experience on the part of the authors, it is also a keystone of a larger initiative at Sitra to help teachers and schools accelerate their capacity to transform teaching and learning for the twenty-first Century. Read more at www.sitra.fi.



CHAPTER 1

Learning at the Edge of History

Justin W. Cook

TO WHAT END?—EDUCATION’S CONTINGENT PURPOSE

It is clear then that there should be laws laid down about education, and that education itself must be made a public concern. But we must not forget the question of what that education is to be... —Aristotle

To What End?

To what end do the United States and the European Union together spend approximately USD 1.3 Trillion each year on education?¹ What return is expected from this investment? What is to be concluded from the fact that the US spends more than USD 600 Billion annually on the nation’s public education system while nearly the same sum is spent reforming that very system? Is this an unavoidable symptom of a complex system; or is it indicative of a system not fit for purpose? Does the system even have a *purpose*? Are the cynics correct in deriding public education as a massive jobs program? Or is it the key to a better future; a platform for addressing humanity’s greatest challenges? Is an education system inherent to the contemporary human condition, like healthcare? Or should youths spend their first years doing something else outside of schools? How would society hold that debate and make a choice?

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Let's start with that word: *purpose*. We are all familiar with the notion of purpose, even perhaps too familiar. Its meaning is why something is done or used; it describes the aim, or intention of an action. Purpose, as it applies to a pencil is clear and virtually unassailable. But purpose as it applies to complex human inventions that continuously evolve beyond the control of any individual or group make purpose a concept difficult to pin down. This is due in part to the fact that these systems continue to operate without regard to whether the actors within the system understand or work toward a larger purpose. However, purpose—in a fundamental sense—is a surprisingly rare focus area in the field of education. Surprising because from an outsider's view, a task as critical and immediate to society's most cherished resource (its children) would seem to require a clearly defined purpose. Yet, a quick review of the education literature reveals purpose to be a marginal topic of research. Most research and thought focuses on practice, authority, learning processes, equity, justice, budgets, etc.—in other words, the mechanics of education. Without question, each of these topics is an area where ongoing research is needed. Teachers must have effective pedagogies. Administrators must find ways to balance authority carefully. Policy makers must be able to assess the system's ability to mitigate social harm among other policy aims. And the system must fundamentally understand how children learn. But to what end? Why is it that society, and even practitioners struggle to discuss purpose coherently with respect to education? To be fair, most agents within complex systems struggle to articulate purpose. But, why hasn't a broad, society-wide debate about perhaps its most pervasive and fundamental activity taken hold especially at this moment when so many of the conditions from which the current education system emerged are irretrievably changed? Why do we focus on reform and not redesign?

Our struggle to answer these questions is due in part to ubiquitous familiarity with the education system. Virtually all of us have encountered formal education at some point in our lives. Even children who are homeschooled are likely using educational resources generated outside the home. According to the 2015 US Census, the average age in the United States is approximately 38. Nearly 90% of people aged 35–44 have a high school diploma or equivalent. Nearly half of those people have an associate's or bachelor's degree (Ryan and Bauman 2016). This means that a significant share of Americans have spent nearly half of their lives in a formal education setting. According to the OECD, “based on

2012 enrolment patterns, a 5-year-old in an OECD country can expect to participate in education for more than 17 years, on average, before reaching the age of 40” usually followed by additional tertiary education (OECD 2014, p. 306). Other than the home, no other setting will be so familiar. This is especially true for professionals working in the field. According to the OECD, the average age of primary school teachers in OECD countries is 42 (OECD 2013). In the US, these teachers hold a bachelor’s degree and 56% hold advanced degrees (NCES).

Teachers are steeped in education systems; from the age of 4 or 5, they have been immersed in an educational context. They are perhaps the only profession whose compulsory, secondary and tertiary education environments are the same in which they work professionally. This fact fundamentally challenges the profession’s ability to step out of a subjective way of seeing. As George Orwell said, “To see what is in front of one’s nose needs a constant struggle” (Orwell et al. 2000, p. 125). This is true for many: because so much of our lives are spent inside schools, education is a relentlessly subjective construct that struggles against the weight of common experience to be seen objectively.

With familiarity comes bias and a lack of critical thought. For much of the population, the purpose of education is self-evident, even though it cannot be clearly articulated. In the United States for instance, public engagement with the public education system seems to spike when attempts are made to change it—to *make it unfamiliar*. This engagement pattern was experienced most recently with Common Core, and before that, No Child Left Behind, judging by frequency of reporting and parent-stakeholder activism (Murphy 2014). Outside of dramatic policy changes, education systems are treated almost as if they were governed by natural laws; an immutable feature of our contemporary landscape. Purpose need not be questioned when it is so blindingly obvious.

For many people—especially the system’s harshest critics—education falls into a category of common sense: we know it to be thus, without knowing why thus is. But common sense is a domain of opinion, unstudied expertise, and strong opinions strongly held. As Paul Saffo insists, strong opinions play an important role in a critical thinking process; strong opinions are a form of intuition built from lived experience and are necessary to confront complexity (Saffo 2008). The problem arises when those strong opinions are also strongly held, meaning that one’s viewpoint is not open to change due the emergence of new information or experience. To approach an objective view of education (and thereby

begin to see its purpose), one must develop strong opinions about education that are weakly held. As Saffo suggests, “*strong opinions weakly held* is often a useful default perspective to adopt in the face of any issue fraught with high levels of uncertainty” (2008). Given the vastness and complexity of today’s education systems, compounded by the uniqueness each educational transaction, *uncertainty* about its nature and purpose is a fitting descriptor even though we are deeply familiar with its essence. Becoming uncertain about education will require a significant cognitive shift for most people.

We also struggle to answer the “to what end” question because of the monopolizing effect delivery has on teachers and other key actors in education systems. Every weekday morning at public schools around the world, 20 or more students with unique needs, abilities, socioeconomic and cultural backgrounds arrive in a classroom to be taught. What they are taught is a product of many competing agendas, some of which originate outside the core objective of learning. For instance, national cultural assimilation which is happening now across Europe in response to the migrant crisis and which has been a priority as long as formal education has been organized by states. Other learning objectives stem from tradition, political or employment compromises, cutting-edge research *and* languishing research, etc.; whatever the source, the path dependencies and inertia inherent in curricular and pedagogical approaches are substantial. It goes without saying that triangulation between the inimitability of a student, the capability of a teacher and the legibility of a curriculum is an extremely challenging task—as much art as science—especially when under pressure from anxious parents and students. The intensity of this transaction between teacher and student repeated 20-fold day after day often crowds out any opportunity to step back and not only see, but think critically and strategically about the big picture. Delivery of education “services” is akin to working on an assembly line where tasks relentlessly advance toward the operative. In education, it is hard to apprehend the important when the urgent is totalizing.

It is no wonder that school systems are notoriously difficult to change. Even if a purpose was clear and an objective set, the urgency to deliver will limit the ability of all actors in the system to take steps toward transformation. The organizational hegemony of delivery is not unique to education. Healthcare faces a similar challenge, and the field shares a similarly viscous rate of change. Yet physicians have put in place certain mechanisms that help them step back and look for larger patterns. Morbidity and Mortality (M&Ms) conferences provide physicians and others

involved in patient care to review recent complications or errors and update outmoded policies to improve their clinical practice and patient outcomes. M&Ms help make hospitals learning organizations. They do this by allowing time and space for teams and individuals to reflect on successes and failures while they are removed from the unremitting and urgent pressures of service delivery. These kinds of practices are rare in education; a factor in its diminished sensitivity to questions of purpose.

The questions *to what end*, and *of what purpose is education* are not new. Nearly 2400 years ago, Aristotle observed, “it is by no means certain whether training should be directed at things useful in life, or at those conducive to virtue, or at exceptional accomplishments” (Ackrill 1988, p. 537). He could not answer whether education was to be concerned with a strong intellect or a good life, but he notes that each one of these possibilities has “been judged correct by somebody” (1988), a presage of the endless reform battles to come. With respect to human wellbeing and a future in flux, both objectives of a good life and strong intellect are necessary.

Even the man who many consider the father of modern education, John Dewey wrestled with questions of purpose. At the close of his Kappa Delta Pi lectures in 1938, Dewey prodded his audience with a series of fundamental observations about the nature of education that challenged hasty agreement with his earlier remarks. The education scholar Philip Jackson (2016) reworked Dewey’s observations into a series of four questions:

1. What must anything whatever be to be worthy of the name education?
2. What is the nature of education with no qualifying adjectives prefixed?
3. What is education pure and simple?
4. What conditions have to be satisfied so that education may be a reality and not a name or a slogan? (p. 8)

The first three questions can be largely collected under question three, “what is education pure and simple?” where Dewey seems to be driving at the essence of education as a human invention. Why do we have it? What function does it serve in shaping our human condition? This touches on purpose in the sense explored earlier but is perhaps even more fundamental. Question four is closer to asking *to what end*? When

education is a reality and not a slogan, it is achieving some desired objective. That means education is no longer a fiction or a strongly held opinion but is working in service of a known purpose. The “conditions” in Dewey’s question are both an understanding of purpose, and a mechanism and enterprise that is designed to deliver on that purpose. The “conditions that have to be satisfied so that education may be a reality” is perhaps the best way to begin to think about the future of education.

Yet because education is a human invention and not the result of natural laws as it is often treated, its purpose has always been contingent—purpose has not been an immanent truth in the Hegelian sense. Education’s contingent purposes derive from context and ideology, history and *the future*, democratic compromise and authoritative control. As societies evolve, the purpose for educating evolves. As war breaks out (or some other existential crisis threatens), purpose is sharpened. As stability and affluence return, purpose becomes diluted (Fig. 1.1). Contingency is perhaps education’s most enduring trait. *Education’s purpose* is a concept that rides bareback on our species’ wild odyssey, hurtling out of the Savannah and into the digital age.

Why is defining purpose so important? Because it flips the debate about education on its head, from one endlessly dominated by argumentative, *deductive thinking* toward *abductive reasoning* and experimentation—a shift that reframes how we think about the nature of the challenge and how to achieve a specified outcome. Currently, the most ferociously debated topics about education are process-related. For instance, whether rigorous standards should be set nationally or locally; what subjects should be taught where, when, how or if at all; the utility of high-stakes testing and international rankings; teacher qualifications; the role of technology, etc. These are *what* and *how* questions—questions that could be answered when the objective for education was known and relatively straightforward (i.e., inculcation and economic development). But as stated earlier, neither is the purpose of education known today, nor can it be said to be straightforward given the multiplying sources of uncertainty about the future. Deductive thinking in absence of purpose leads to an endless loop of competing narratives about what must be done to fix education. It also creates an ever-shifting landscape of priorities as the preferred outcome of the system can always be defined and redefined locally.

Abductive reasoning can disrupt this loop because it must begin with a clear articulation of a specified outcome, then asks how that objective

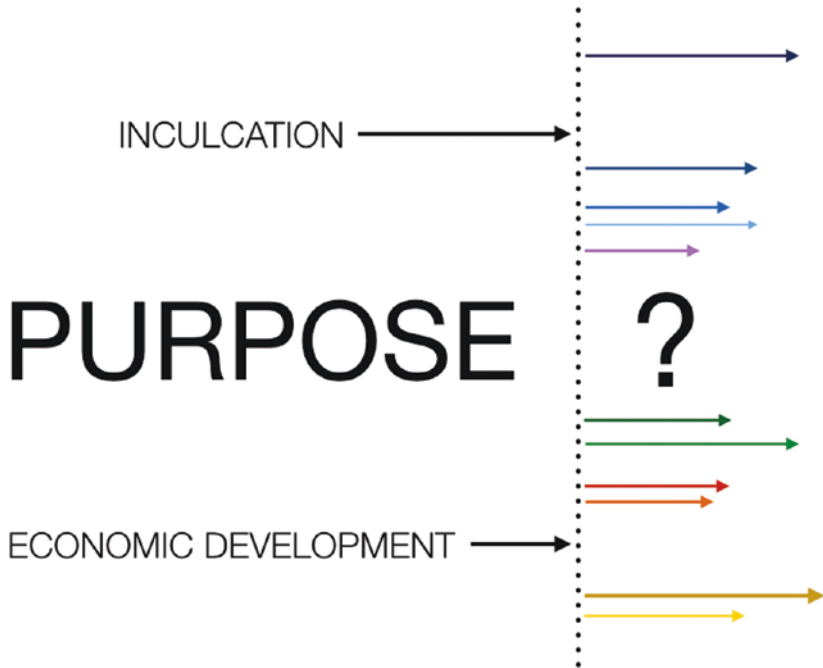


Fig. 1.1 Education’s decay of clear purpose in the twenty-first century (by author)

can be achieved. In his book *Frame Innovation*, Kees Dorst (2015) contrasts “design abduction” (Dorst, 49) with deduction, which he claims to be a traditional, analytical way of thinking that is outmoded by the complex nature of today’s wicked problems (of which I would include education). Dorst suggests, “In design abduction, the starting point is that we *only* know something about the nature of the outcome, the desired value we want to achieve” (49). The task then is to figure out the process questions outlined above. He illustrates this distinction using the reasoning frame *What + How = Outcome* (45):

Deduction: What + How = ???

Design Abduction: ??? + ??? = Outcome

In an abductive reasoning process, the outcome must be specified first, agnostic to the means (the what and how). Dorst points out that the means will vary as more is learned about the outcome because of the emergent and adaptive nature of complex challenges like education and thus are fluid. The outcome is held relatively constant, while the means are adjusted to achieve the outcome, even as context and conditions change. This process will ring true to anyone who has set out to catalyze a new or preferred reality. One begins by conceptualizing a new reality (via a vehicle such as a vision statement, manifesto, sketch or diagram) and works to shape conditions toward that reality by various interventions. One generally does not begin this kind of design process by determining what can be done—what reality should be—only after analyzing the existing constraints. Homebuyers for instance, rarely start dreaming about a new home by thinking about budget. The first thoughts that come to mind are location, size and envisioned lifestyle. The means then must be adjusted to achieve that vision, if they can be.

Today, with respect to education and many other core institutions and organizing principles (i.e., democracy), renewing or redefining purpose is critical as the public's confidence in them is slipping away. This is moment of abductive redesign, not incremental improvement. We must have the forthrightness and vision of our forebears who set in motion the construction of these systems and institutions from which we have long benefited but also struggle against today. This necessity for redesign is colliding with the prospect of a radically different future where consciousness itself may no longer be the core competitive advantage of human beings and intelligence has been ceded to machines. Technology, globalized networks and planetary environmental crises are entirely redefining relationships between peoples, between people and the planet and their respective futures. Our newsfeeds are brimming with the indicators of transformation. Our task now is to define what kind of transformation education should undergo, how and to what end.

THE GREAT TRANSFORMATIONS

Something has shifted, it seems. We are making new worlds faster than we can keep track of them, and the pace is unlikely to slow.

—Benjamin H. Bratton

Much of our contemporary education systems' structure was designed in an era undergoing revolution. Today, the twin revolutionary forces of digitalization and globalization are driving transformation in every domain. But in late nineteenth-century America, widespread industrialization, urbanization and an immigration-fueled population boom following the Civil War were profoundly (re)shaping the country. These demographic and economic shifts combined with a reformist push for literacy and universal human rights (especially labor rights) set in motion the formation of a public education system. Like many things in America, the story is much more complicated because of scale and the diversity of local, state and federal approaches (for instance, Massachusetts made school compulsory already in 1852 while the final state, Mississippi, did not do so until 1917). However, in general, inculcation of national mythos and economic development were top priorities driving formalization of schooling. Ideas held at that time about the purpose of education are hard to state with precision. But I would argue that when the larger elements of the American education system were put in place, the purpose of education would have ostensibly been clearer: Education could help build a nation using the levers of cultural indoctrination of manifest destiny and individualism together with preparation of an industrial labor force. These cornerstones of education—age-based enrollment, subject-based curricula, teacher as authoritative arbiter of knowledge, vocational preparation—persist to today, commonly captured in the “industrial model of education” mantra.

John Gast's 1872 painting *American Progress* (Fig. 1.2) captures the ferment at the birth of modern America. The allegorical figure Columbia at center shows the way from the light of the East into the darkness of the West. In her left hand, she spools-out telegraph wire, marking the way for the trains that would become the backbone of industry. In front of her flees the collateral damage of nation building (Native Americans and bison). Behind her, the promise of urbanization and mercantilism are softly lit by a rising sun. In her left hand, she cradles a “School Book”, indicating the central role public schools will play in realizing the young nation's destiny. Education's purpose could not be more important or manifest to the future of a people: to build a political and economic order where none had existed. Of course, the reality was much more varied than Gast's painting suggests, but the symbolism is nonetheless potent and still informs widely held notions about what the



Fig. 1.2 *American Progress* by John Gast, 1872 (PD-1923)

American education system is intended to do even as the specifics have changed over the last 150 years.

Finland's origin story similarly positions education at (or near) the center of its rapid transformation into an industrialized sovereign nation. Only 100 years ago (1917), Finland declared independence from Russia. At the time, its population of just over 3 million Finns was mostly rural and agrarian, distributed across a large, sparsely populated country. But the population was on the move in search of opportunity in cities. The emerging nation was also in search of a coherent national identity, having been part of the Kingdom of Sweden since the thirteenth century until it was ceded to Russia in 1809. Even after the Second World War, Finland was largely agrarian (Nieminen 2007). The 1950s marked a rapid change from just under half of the country working on farms and 1/3 of the population living in urban areas to today where more than 85% of the population lives in urban settlements and nearly 3/4 of the population works in service and administrative industries (Statistics Finland).

This national transformation did not happen in a vacuum—without the influence of public policy. Public education, providing equal access to all, was a cornerstone of Finland’s development (and continues to be central today; see Finland’s National Curriculum Case Study). Through it would be promulgated the core components of national identity such as shared language and culture. Education would provide the preconditions to an industrialized society such as vocational skills, literacy and a professional class. A strong education system would also vest future generations in the institutions that would construct stable and effective governance structures while fostering the shared ambitions and norms that would enable greater harmony in an increasingly urbanized country. Of course, education did not achieve this alone—many factors were at play. But the national education system was a key instrument of nation building, evidenced by early actions such as the establishment of a Supervisory Board of Education in 1869 and an 1898 decree requiring local authorities to provide all children with schooling. Finland’s Constitution enacted two years after independence required compulsory and general education to be provided free of charge (Finnish National Agency for Education) and the education system endures as a source of pride and competitiveness for the nation.

What these illustrations suggest is that education’s purpose is most clear during a nation’s transformation. That as a country develops, the institutions that shape development have an instrumental role, and thus their purpose is articulated, shared, resourced, and acted upon. But once a country has become developed, and these institutions achieve their transformative mandates, they naturally shift their focus to administrative activities such as maintenance, dispute resolution, incremental change management, and measurement and adaptation. In this administrative environment, organizing principles such as purpose become diffuse and often contradictory across populations as basic needs are largely met and sources of subjective wellbeing become more diverse. Once education is managed as an administrative task, society loses the urgency for renewal and reinvention; the system itself becomes self-sustaining and resistant to significant redefinition.

This administrative state has persisted in the US and Finland (among most other Western countries) for decades, a condition which goes some distance in explaining why public education systems are largely locked in an incremental innovation and reform pattern. In contrast, it is not unusual to encounter education leaders in developing contexts who have

both a crystal-clear understanding of the purpose and subsequent means of education because for their students, an education is the best—if not only—vehicle to escape poverty. However, in developed nations the need for transformation has emerged again as the orthodoxies of the past seem less and less relevant to the current and future of education as global crises escalate and revolutions in many domains overturn ways of living, working and learning.

CONVERGENCE TO COMMON PURPOSE: SUSTAINABLE WELLBEING

In the face of climate change, everybody is an environmentalist.

—Steward Brand (2009)

Just like the nineteenth century national scenarios outlined above, populations are facing a new existential crisis as the adolescence of the twenty-first century comes to an end. This time, rather than being an isolated event experienced by embryonic nations, this crisis is common. The disruptive forces of digitalization and globalization together with the rising threat of a climate catastrophe and the push for more sustainable social and economic systems have set in motion what is becoming a global existential crisis—an era linking together the collective fates of all people. Jeffrey Sachs amplifies this view in the opening to *Common Wealth*: “The defining challenge of the twenty-first century will be to face the reality that humanity shares a *common fate on a crowded planet*” (Sachs 2008, p. 3). Why such strong language? The global architecture that has kept global systems stable since the end of World War II is crumbling. Democratic institutions and norms are in retreat in many countries. The spread of liberal internationalism is being slowed by rising populism. Income inequality is at historic levels as employment futures for both blue and white-collar workers are clouded by the rise of technology as a viable alternative to a human labor force. The Holocene climate upon which the human species has staked its twelve millennia of development is showing its destructive alter ego. These are the existential facts of life, true not just for certain segments of the global population, but for everyone. And in response, the faltering systems that have enabled the ascendancy of humans are being questioned—in some cases, redesigned.

Sustainability has been the overarching, but vague narrative for how humanity can contend with the conflicts inherent in its extractive and destructive activities, socioeconomic models based on growth and

the finite nature of planetary resources. Like many far-reaching concepts, sustainability suffers from meaning everything and nothing all at once. Is sustainability *Save the Planet* sloganeering? Earth Day? School recycling programs? The United Nations Framework Convention on Climate Change? Electric cars? Plant-based diets? Biodegradable utensils? Education for Sustainable Development? Greenwashing? Surely it is all of these things, and more. Hence the challenge of understanding what the concept means. Often, the Brundtland Commission's definition² of sustainable development is cited when introducing sustainability. But this too has limitations. For instance, how can we anticipate the needs of future generations? Certainly, the settlers scratching out an existence on the American plains or tar burners in rural Finland could not anticipate the needs of today's citizenry. Nonetheless, the notion of preserving opportunities for future generations to thrive does provide some direction. And standing by as climate change makes the planet uninhabitable is a clear violation of the Commission's findings.

Of most relevance to this moment three decades later is not the Brundtland definition, but the assertion of our common fate arising from humanity's "interlocking crises" (4) outlined in the Commission's seminal report, *Our Common Future*. In their telling, the planet is no longer compartmentalized; humanity is bound together by a newly recognized unfragmented reality of our own making whose destructive potential was perhaps understood obliquely only once before during the height of the Cold War. Sustainability, the catch-all, would come to represent a new model—a dramatic shift in direction for society and the planet. Its nature was not known with great precision and its credibility as a true reversal of humanity's most destructive behaviors would have to be tested, but yet this model held the promise of enabling humans to become planetary stewards (Steffen et al. 2011).

In order to advance past *Our Common Future*, can we be more specific about sustainability? And if so, what does that yield, especially with respect to education? My organization, Sitra-The Finnish Innovation Fund occupies an unusual space in the political, industrial, and academic systems architecture of Finland. Sitra is a public fund with accountability to Parliament, but enjoys independence by virtue of its endowment established by the Bank of Finland in 1967. Its mandate is to improve Finnish society and the economy by providing thought leadership backed by strategic investments that can spur transformation. Since 2012, Sitra has been working to develop an ambitious societal model for the near

future organized around the theme of *sustainable wellbeing*. In this distinctly Nordic approach to sustainability, society would build upon the strengths of Nordic social democracy and focus on helping people achieve rich and meaningful lives. This, we believe, is a precondition to spurring a rapid societal transformation toward sustainability; it is when sustainability becomes conflated with sacrifice or austerity that status anxiety and other fears overwhelm an individual's willingness to change behaviors. Nonetheless, in this model, planetary boundaries (Steffen et al. 2015) are the necessary overarching constraint on human activity, while systems of human and social capital aligned with more efficient and human-centered economic and governance models form the building blocks of a sustainable wellbeing society.

As part of Sitra's second working paper on sustainable wellbeing (Hellström et al. 2015), we developed from extensive research six interrelated principles upon which society could establish a new narrative about its future and initiate a transformative cycle of sociotechnical development:

1. Addressing Wellbeing in a Holistic Way: Daily life has become vastly more complex for most people. To cope, better life-management skills and social inclusion are needed; wellbeing must be made a political priority. Personalized solutions that support physical and mental wellbeing while requiring individual responsibility must be prioritized.
2. Adjusting to Planetary Boundaries: Climate change and resource depletion are already acting on societies. The elements of environmental sustainability, such as de-carbonization, must form the basis of policy-making in both public and private sectors.
3. Empowering Individuals and Communities: People must have a voice in the issues that affect them. Citizens must begin to share a vision for a sustainable future and most importantly, be able to find a place to thrive in that future. They must be treated as co-owners, not just customers of policy decisions and community-based solutions should be prioritized.
4. Moving to a Regenerative and Collaborative Economy: Economic structures need to be reformed to foster wellbeing without relying on increasing consumption of natural resources. Businesses should not be treated as if they exist in isolation but are treated as part of an ecosystem. Collaborative and sharing economies point the way forward.

5. Building Competencies for a Complex World: New competencies will be needed to thrive in a complex, interconnected world where information is ubiquitous. Learning will be lifelong and life-wide. The unique potential of each person is a source of value in an automated world.
6. Developing Inclusive and Adaptive Governance: Governance must evolve both within government and among communities. Administrative silos must be dismantled where necessary in favor holistic, horizontal approaches to policy challenges (Fig. 1.3) (Hellström and Hämäläinen 2015).

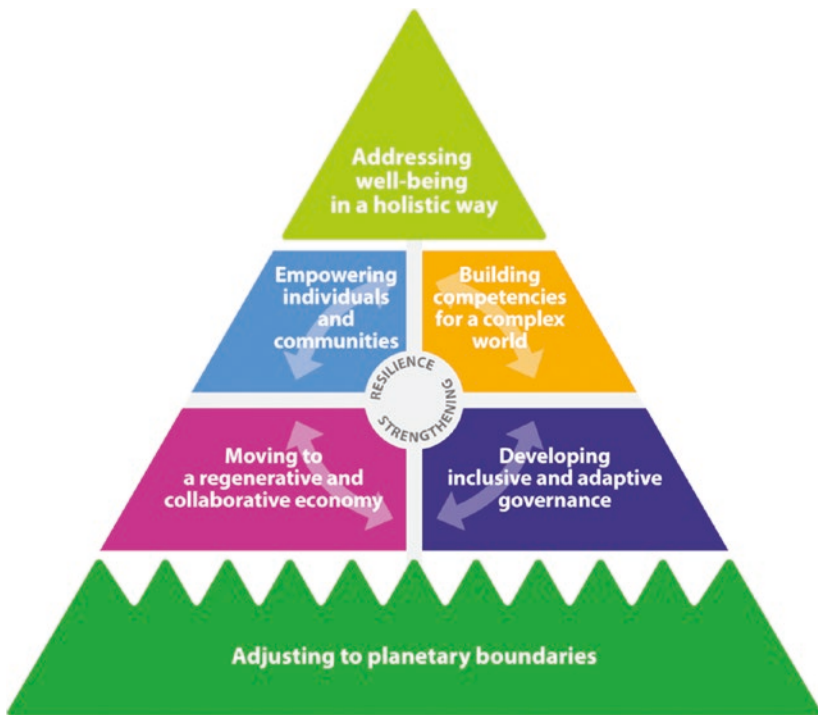


Fig. 1.3 Sitra's Sustainable Wellbeing Model

These principles aim at propelling Finnish society toward a future where the nation is in balance with the planet, and key systems and institutions are geared to enable human wellbeing. A structural transformation such as this is immensely complex and will touch every sector, organization and governance structure. There will be failures and successes in equal measure. Therefore, sustainable wellbeing research and development will continue to evolve on many fronts by many actors in and outside of Finland. Sitra and its partners are deep in the work of systems change organized under three strategic focus areas: society's capacity for renewal; a carbon neutral, circular economy; and a new working life and sustainable economy. It is expected that the thinking, experiments, investments, coalition building and other efforts conducted under this rubric will together provide a model that can inform the practices of others as they work toward that elusive objective: *sustainability*.

Sustainable wellbeing is a societal model born out of this singular moment in history where humanity must converge to common purpose in the face of common threats. It is impossible to know if sustainable wellbeing will endure as an organizing principle, but the focused research and experimentation happening globally suggests that this is the moment where sustainability is a concept finally filled with meaning and procedure. This convergence is an opportunity to rethink and redesign many elements of humanity's operating system, not least of which are its systems of learning.

COMPLEXITY AND CHANGE IN SYSTEMS OF LEARNING

Not even revolutions can change schools!

—Jari Salminen

If in this century, humanity will finally come to recognize its common fate—and must therefore converge to common purpose—how will systems of learning need to transform? In what ways will teachers, students, schools, curricula, administrative systems and all of the other mechanics of teaching, learning and organizing undergo transformation, alongside the rest of society? How does a system so complex as education, with an unceasing obligation to deliver and infinite permutations, disrupt its enormous momentum and transform? How will new structures, patterns, and cultures replace old ones?

It is no secret that schools and especially school systems are hard to change. Dozens of books, articles and opinion pieces are written on how and why to change schools each year. Vast sums of public and private capital are spent on reform toward that end. But as explored earlier, these reform agendas lack an overarching vision for what the purpose of education is to be, especially as humans assume control (and agency) over global systems. Reformers tend to imagine the future as continuous with the past—progression rather than disruption—further entrenching change as a grinding, incremental process; all the while narrowing what is understood to be possible when confronting stagnant education systems. These efforts are also rarely joined-up to leverage individual strengths toward common ends, as one might approach an investment portfolio. And reform is almost always additive, each intervention adding yet another layer of complication onto an already astoundingly complex system.

Within the education field in particular, complexity is a significant barrier to change due to the large number of constituent elements and agents interacting within the system. One simple model tracing accountability for individual schools developed by the OECD (Burns and Köster 2016) identified nearly twenty stakeholder groups that share governance of the school including:

- School Community
Principals, teachers and students
- Governance Community
Training providers, education material providers, private business, parents, communities, local authorities, school boards, school providers, ministry, inspectorate, government agencies, NGOs, labor unions, media, researchers, international organizations, philanthropies, higher education institutions, standardized testing organizations, and related consultancies

To this list can be added the many political figures that claim a stake in education and whom prioritize certain reforms as part of their political agendas. It is also worth recognizing the substantial number of NGOs that can operate in and around schools that have significant influence. Boston Public Schools for instance works with over forty local and national NGOs to provide supplemental services to students, families, teachers, and other professionals working in the system (Pfeiffer 2016).

The complexity of a school system arises from the vigorous interaction between these elements and the specificities of its particular context resulting in *emergence*, an axiom of complexity theory. The science journalist M. Mitchell Waldrop (1993, p. 88) described emergence as:

...the agents [elements of a system] were constantly organizing and reorganizing themselves into larger structures through the clash of mutual accommodation and mutual rivalry. Thus, molecules would form cells, neurons would form brains, species would form ecosystems, consumers and corporations would form economies, and so on. At each level, new emergent structures would form and engage in new emergent behaviors. Complexity in other words, was really a science of emergence.

Each arena of interaction between the school community and the governance community, as well as within communities themselves, result in unpredictable behaviors and properties that impact school performance, sustain certain ethos or resist change. Two important implications of emergence are self-sustaining momentum and new independent behaviors that contribute to the evolution or stagnation of a school system. Momentum and independent behaviors can manifest in the resistance to change common in schools, sometimes described as *lock-in* or the inability to shift away from dominant paradigms. Another implication is that any small, seemingly insignificant element or dynamic within a complex system may in fact be significantly responsible for its behavior. As Mason describes it, “seemingly trivial accidents of history may increase dramatically in significance when their interactions with other apparently minute events combine to produce significant redirections in the course of history, significant shifts in the prevailing balance of power” (Burns and Köster 2016, p. 44).

This last aspect of emergence arising from complexity should undermine confidence in the ability of standardizing administrative systems to effectively be sensitive to what in fact constitutes the system, understand what dynamics are driving behavior and direct school systems toward different outcomes. The efficacy of administrative systems is further limited by the conflict between standardization and contextual variance. As Mason points out, even the trivial (what would commonly arise from contextual peculiarities) can have outsized impact on a system’s behavior. Thus, scaling local innovations across systems remains both a pervasive goal and a persistent myth as evidenced by the experiment with charter

schools in the United States among countless other reform efforts unable to achieve their large-scale, transformative promise. Centralization will always be disadvantaged by emergence.

Mason also points to the dynamic relationship between the number of elements in a system and its complexity, “the successive addition of new elements or agents to a particular system multiplies exponentially the number of connections and potential interactions among those elements or agents, and hence the number of possible outcomes” (44). What this means for schools is that each new reform or intervention by an NGO or political directive for example, layered over the existing operating model, further complicates the system, making it less knowable and less agile. In other words, efforts toward change performed in absence of redesign of the system (or at the very least prioritization of subtractive decisions—deciding what not to do), only contributes to the school or school system’s ability to resist change. Emergence and exponential expansion of interactions inherent in school systems means by definition that administrators have few direct levers of control despite beliefs and expectations to the contrary. Governance of an emergent system is at best improvisational, guided by “practical wisdom” (66). In other words, mechanistic approaches to changing schools are almost guaranteed to have marginal impact. Governance must be adaptive and based on the careful distribution of authority throughout the system to allow for democratized innovation and improvement processes. Of all of the strengths of the Finnish school system, it is perhaps the distribution of authority combined with high level and progressive agenda setting that have made it a structurally sound model. Trust is the key currency that sustains this structure and is often the missing ingredient or pre-condition in other countries hoping to replicate Finland’s success.

Stepping back, it is valuable to examine the nature and properties of activity common to education systems and learning more generally, given the role emergence plays in shaping educational systems and therefore outcomes. As suggested earlier in this chapter, each transaction conducted in a school community is essentially unique. Looking only at teacher-to-student instructional interactions for instance, the number of dynamics at play influencing the transaction are myriad: (student) socio-economic status, nutrition, family history with respect to familiarity and access to education, motivation, confidence, trust, etc.; (teacher) compensation, training, workload, investment in success of the school, tenure, class size, curriculum, testing regime, etc. Each time a lesson is put

before a learner, or an instruction is provided, or students work together in groups, these underlying conditions—some of which are structural, and others are individual—combine to shape outcomes. Uniqueness is endemic in education systems. While other fields such as medicine have generally found ways to standardize how practitioners interact with the complex, biological human organism, education remains immune to reductionist programs. If anything, education has actually grown in complexity related to the uniqueness of transactions due to the diversification both in inherent and acquired terms of the communities that schools serve. For instance, the rethinking of long-held mental models such as the existence of a “normal” cognitive ability aided by developments such as the neurodiversity movement add additional vectors of uniqueness in educational transactions. Other examples abound from demographic shifts to the atomizing impact of social media and other technologies. Thus, education specifically and learning more generally is beset by non-standard transactions and therefore adaptive behaviors in order to overcome the inability to standardize (emergence). The elements of education interact to generate new behaviors and properties that seem dislocated from what common understanding would say constitutes the education system.

Yet from an administrative point of view, there is an overriding expectation that educational transactions, properly conducted will yield predictable results. And therein lies a central conflict in reform movements (systems change) in education. By not attending to the complexity inherent in education systems, administration writ large is an ineffective framework for governance. Governance must follow from a set of shared principles that emanate from a clear understanding of education’s purpose. It demands a whole of system approach that finds “the right combination of mutually reinforcing dynamics” (30) through active experimentation, adaptation, and a bias toward agility and renewal rather than stability and predictability.

But of course, education systems cannot be *shut down*, redesigned and then restarted as one might an outdated factory; they are critical infrastructure vital to a nation’s social fabric. Education systems are heavy, path-dependent systems driven like a flywheel propelled by the momentum of everything that has come before, and fears of what change could bring. And despite their episodic operational tempo, schools are in continuous operation in one way or another (contracts, curricula, legal and statutory obligations, facilities, etc. persist beyond the academic

calendar). So how can the opportunity for change be created? Given the overwhelming professional reality for teachers and administrators to deliver instruction, manage conflicts, and fill in where other social services fall off—just a few of the many de facto job requirements of educators—how can the conditions be set for transformative change?

There are at least two critical vectors for promoting change in complex systems: first, a restoration, renewal or redefinition of the purpose of the enterprise that constitutes some or all of the system (answering the above question: *to what end?*); second, creating a space or zone of exemption within or at the margins of the system that enables experimentation and new ways of working, even if they seem to conflict with the norms of the system. In a school system, this zone of exemption could be a classroom or cluster of classrooms, or it could be an entire school within a school district. However, in order for any insights gained to transit beyond the borders of the exemption zone and into the broader system, an organizational learning mechanism must be in place. In terms of organizational architecture, this means that the school or school system must have the means to critically evaluate and learn from its performance. In order to change, schools must become learning institutions, not just institutions of learning.

As discussed briefly above, physicians and hospitals have enabled organizational learning through the practice of Morbidity and Mortality (M&Ms) conferences. M&Ms provide the machinery to manage and adapt to the complexity and emergence inherent in healthcare. Similar learning paradigms exist in other industries. The aviation industry for instance, would today be beset by passenger jet crashes had the federal government not developed a rigorous forensic engineering regime activated after each accident large and small. The National Transportation Safety Board (NTSB) has primary authority to investigate accidents by deploying “go teams” composed of different kinds of experts working in concert with representatives from industry to develop a holistic understanding of what happened and why and to make recommendations that inform everything from engineering specifications to pre-flight safety briefings. The NTSB is a prime example of organizational learning operating at scale across a diverse, fragmented industry.

Why is there not an analog of the NTSB for education? Funding priorities is an obvious first answer. However, the question reveals a fundamental error in the original “design” of most education systems: *they were devised to convey stable bodies of knowledge to average pupils.*

Education systems were not designed to cope with the complexity inherent in the enterprise of teaching and learning or the pace of exponential change in the twenty-first century. It is worth highlighting that the concept of average that shapes so many of our modern systems and institutions (in healthcare, the Body Mass Index or blood pressure; in social policy, the average income of certain classes of workers; in higher education, admissions based on standardized test performance relative to an average) is not a natural law but a revolutionary invention of the eighteenth century. Adolphe Quetelet, the astronomer turned author of *average* “declared that the individual person was synonymous with error, while the average person represented the true human being” (Rose 2016), setting in motion the reconceptualization of the human according to standardizing logics derivable from data. There are encouraging trends however in some schools and districts to reorient instruction around the individual learner rather than the average emanating from larger societal changes such as the neurodiversity movement and practice level support from important books such as *Schools for All Kinds of Minds*. This broader shift toward personalization enabled largely by technology still has far to go to determine its real potential, but the impact on medicine, education, and other domains could be profound.

An effective example of how to create a space for change in a conflicted system is the work of Creativity Culture and Education (CCE). CCE is an international foundation based in Newcastle UK that has worked with over a million students and tens of thousands of teachers around the world to help them regain the possibility of creativity in teaching and learning despite a system some say is designed to kill it. CCE’s approach utilizes carefully designed interventions that aim to create a platform for new possibilities, dialog and language in traditional, struggling school systems. The basic model is to partner creative practitioners (called Creative Agents) such as artists and designers with teachers and students to design shared cultural activities related to classroom subjects. Creative Agents are key because they lack the constraints teachers and administrators must navigate and tend to focus on process rather than outcome: where teachers will adhere to a standard for “what”, Creative Agents adhere to a standard for “how”. For instance, a project in a math class lead by a Creative Agent might be intended to de-siloize math from its often isolated and isolating experience. Through a seemingly tangential project co-led by the Agent and teacher, math would

become entangled in the world in students' minds; part of a larger narrative rather than a discrete subject.

In order to establish the enabling conditions, CCE coordinates with at least seven layers of governance in advance of the intervention: government, arts councils, schools, headteachers/principals, teachers, students, and parents. In the process, both students and teachers engage a new, exploratory language of creativity, challenge traditional roles and hierarchies and thereby, open the opportunity to explore fundamental questions of community, learning and motivation. This focus on creative language leverages research that suggests poor students especially are mainly exposed to administrative forms of language and have limited access to exploratory language critical to creativity. Within this space of critical reflection, the CCE process enables dialogue around the purpose of education to rise to the surface, offering even the most static learning environments an opportunity to discuss alternative futures and ways of working. And students are shown tools that enable their agency and therefore help unlock their creativity. This process of intervention, reflection and redirection is critical helping school systems escape the inertia of their pasts and open zones of experimentation and change. Follow-up analysis has shown math and literacy improvement as well as improvements in attendance following CCE's interventions.³

If the second vector of change (zone of exemption) is to become transformative, in addition to requiring the feedback loops available to a learning organization, the change process will require a sustaining architecture that can span the significant time scales necessary to overcome structural challenges such as school culture or instructional practices. This architecture must also be able to attend to as many of the stakeholder groups listed above as possible. Writing for the OECD, Mason (2014) argues, "change and sustainable development in education, at whatever level, are not so much a consequence of effecting change in one particular factor or variable, no matter how powerful the influence of that factor. It is more a case of generating momentum in a new direction by attention, as I have argued, to as many factors as possible" (p. 6). This means that transformative change cannot be a marginal activity. Change requires the convergence of many dynamics. The complexity of schools and school systems obliges a substantial investment in redesign (inducement) to keep open the spaces where alternate futures can be glimpsed and struggled toward. In a highly resource constrained environment

such as a school, this investment is likely out of reach. So, what can be done? For this question, there are no easy answers.

However, part of the answer lies in the mindset of those seeking change. Thinking in terms of systems is the first step. Systems design, while possibly feeling overwhelming to already overburdened teachers and administrators, can be made accessible by showing the extent to which these communities already act as systems designers out of necessity. If design is fundamentally about taking actions to realize change one wants to see in the world, educators are certainly qualified. Next is to familiarize these educators-come-designers to frame challenges in terms of systems problems and to shape decision-making according to system-level dynamics rather than object or issue level problems. How? By following the decades-old advice of Finnish architect Eliel Saarinen when developing one's praxis:

Always design a thing by considering it in its next larger context—
 a chair in the room,
 a room in a house,
 a house in an environment,
 an environment in a city plan.

By democratizing the ability of stakeholders in educational systems to work toward alternate futures, the critical mass necessary for systems change can be reached; attention can be paid to as many factors as possible. A systems design capability will provide educators agency in realizing a better future.

LEARNING FOR THE FRONTIER

At the edge of history the future is blowing wildly in our faces, sometimes brightening the air and sometimes blinding us.

—William Irwin Thompson (1979)

A prosperous future can only be one that has been transformed by humanity coming to terms with its common fate. It is a future of interconnectedness, diversity, complexity, disintermediation, and fluidity. The taxonomies of isolation and reduction will be knitted back together into a holistic understanding of ecosystems and planetary systems,

reinvigoration of the humanities as both theory and praxis participating in those systems, and redefinition of fundamental organizing principles of modernity such as value and average. This is no less a significant shift than that underway since the Enlightenment. But this history is rapidly retreating in the rear view and the world is becoming governed by a new set of rules, most of which are not yet known.

Yet humanity has been here before—for much of its existence in fact. This condition still captures the imagination of Americans and informs their character 150 years after “the west was won”. It enchants Finns as they retreat to nature during summer rituals. It is the state of living on a frontier.

Learning at the edge of history means that humanity is now learning for the frontier. At this extreme limit of known territory, of known knows as Donald Rumsfeld would have it, the objective and act of learning and the purpose of education must be redefined and continually renewed. It means that even with the massive increase in the stock of human knowledge, the unknown now may outweigh what is known. How could that be possible? Because what is known now must be reexamined in relational terms. The intellectual efficiencies gained by eliminating contingencies such as “externalities” in economics, cannot be sustained in an interconnected, common era. Humanity must now learn to navigate the expanding white spaces between known knows.

For the enterprise of education, this means that the division of phenomena into subjects represents a fundamentally flawed way to understand the world. It means that real world connection must be established to classrooms and curriculum in order to ensure education systems are not outmoded by a rapidly evolving global landscape and that learners understand their agency in realizing alternate futures. The objective of learning, therefore must be to restore human agency (an idea akin to Carol Dweck’s *growth mindset*). Theory and practice must be joined together; MIT’s motto *Mens et Manus* (mind and hand) is more relevant and applicable than ever. Diversity of ability, ideas and beliefs will be the only way to reliably navigate the frontier of the unknown.

Technology will undoubtedly give students an unprecedented, multi-dimensional space of options, opportunities and even realities. Tech will continue to drive change at a pace unimaginable in the confines of human institutions. Can current and future generations retain control over technology? The scientist Danny Hillis (2016) suggests that:

As our technological and institutional creations have become more complex, our relationship to them has changed. We now relate to them as we once related to nature. Instead of being masters of our creations, we have learned to bargain with them, cajoling and guiding them in the general direction of our goals. We have built our own jungle, and it has a life of its own.

Perhaps then the objective of learning with respect to technology is not so much control as it is to define its effect while navigating the ways it changes fundamental relationships and definitions. This fluidity between what is certain and what is new is endemic to the frontier, to Hillis' "jungle".

In a 2017 event at the OECD in Paris, the relatively newly appointed head of the Finnish National Agency for Education Olli-Pekka Heinonen claimed in effect that the Enlightenment project of *certainty* had come to an end. That the task now is for societies and institutions to embrace uncertainty as an organizing principle of this era which will demand that humanity question how fundamental assumptions have been constructed and how knowledge has been organized. While this may seem unnerving, perhaps even frightening, it is also an opportunity no less exhilarating and full of potential than what René Descartes must have viewed as he peered into the brightened air of the future. It can also be made very simple. In the documentary film *Look & See* (2016), its subject Wendell Berry observes that we live in an age of divorce where "things that belong together have been taken apart". In order restore the connection between things and to make progress, "you take two things that ought to be together, and you put them back together. Two things, not all things". Our task in his view is to convert parts into wholes.

For students and (lifelong) learners more generally, the opportunity now is to not just be subject to the future, but to be complicit in its formation. At the edge of history, nothing is given, everything is frontier.

NOTES

1. US: USD 620 Billion, 2011–12 (<https://nces.ed.gov/fastfacts/display.asp?id=66>); EU-28: EUR 672 Billion, 2012 (http://ec.europa.eu/eurostat/statistics-explained/index.php/Educational_expenditure_statistics).
2. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
3. <https://www.creativitycultureeducation.org/research/>.

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CHAPTER 2

Toward Robust Foundations for Sustainable Well-Being Societies: Learning to Change by Changing How We Learn

Harold Glasser

WELL-BEING CONCERN: A LONG VIEW ON THE HUMAN PREDICAMENT AND PROGRESS

“As long as the people of your culture are convinced that the world belongs to them and that their divinely-appointed destiny is to conquer and rule it, then they are of course going to go on acting the way they’ve been acting for the past ten thousand years... You can’t change these things with laws. You must change people’s minds. And you can’t just root out a harmful complex of ideas and leave a void behind; you have to give people something that is as meaningful as what they’ve lost – something that makes better sense than the old horror of Man Supreme, wiping out everything on the planet that doesn’t serve his needs directly or indirectly.” (Quinn 1992, p. 249)

In this chapter, I explore foundational issues around the meanings, creation, measurement, and continuous renewal of sustainable well-being societies. My central premise is that the separation between how we currently behave as a species and exercising the “better angels of our nature”¹ is not limited by

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innate capacities or “human nature,” but by learning to recognize, liberate, and harness many of the latent capacities we do have in service of people and the planet. Learning how to leverage these capacities should start with probing the deep roots of why sustainable well-being societies are not ubiquitous today, not with trying to generate increased awareness, care, or concern, however important they are—as these already exist to a significant extent. In fact, ruminating on the conditions that enhance or diminish quality of life has both fascinated and anguished people for millennia and spawned a modest, yet sincere and serious, tradition around advancing human well-being.²

This discourse on human progress, which is both wide and deep, ranges from envisioning “ideal” societies that elevate the common good to cautionary tales about key stumbling blocks and nightmarish worlds that could result from untamed recklessness, greed, and foolishness. It includes practices for cultivating self-knowledge, virtue, compassion, wisdom, and our shared humanity and speculations about why *Homo sapiens*—of the at least 4 *Homo* species extant 40,000 years ago—are the only *Homo* species alive today. Popular themes, which have existed for at least four millennia and are exhibited across cultures, include avoiding biophysical and social carrying capacity limits, building just and equitable societies, distinguishing among needs and desires, respecting all life, and coupling awareness and concern to meaningful action.

Making many illuminating, but disquieting, parallels to contemporary society, Samuel Noah Kramer (1981, pp. 259–269) used Sumerian literary documents from 4000 years ago to chronicle the first “sick” society. Kramer showed how Sumerian society asserted equanimity but was incessantly at war; avowed commitments to fairness, equality, and kindness, but teemed with unfairness, inequity, and cruelty; and undermined the ecological systems upon which thriving economies depend by pursuing shortsighted, unsustainable economic growth (p. 259). The Sumerian *Epic of Gilgamesh* (Kovacs 1989), perhaps the first literary classic, and its precursor, *Gilgamesh and the Cedar Forest* (Shaffer 1983; Al-Rawi and George 2014), can be read as cautionary tales about the trials and tribulations that may befall us if—filled with hubris, ennui, or a mindless search for lasting fame—we transgress our essential humanity, demean our relationship to nature, or attempt to defy our mortality.³ Like operating a funnel in reverse, these early concerns about advancing and sustaining well-being expanded over time.

Plato (427–347 BCE) outlined what may be the first “ideal city” in the *Republic* (1925) and in *Critias* considered the ills of deforestation and its effect on erosion, biological diversity, and local climate change (1989, pp. 271–275). The Chinese philosopher Mencius (372–289 BCE) discussed

the importance of following specific harvesting practices, rates, and times to maintain both high yields and high quality of life (Hughes 1989). Emperor Ashoka (304–232 BCE) unified most of the Indian subcontinent through brutal conflict, yet became one of the most exemplary rulers in history. His most lasting influence—the rock and pillar Edicts of Ashoka, scattered around modern-day India, Nepal, Pakistan, and Afghanistan—outlines real-world reforms and policies for a just and humane society, wildlife conservation, respect for all life, and vegetarianism (Nikam and McKeon 1966). Vitruvius (≈80–15 BCE), the Roman architect and engineer, drawing on well-understood health problems that were ubiquitous among lead smelters and crafters, cuts a bit too close to the bone by spotlighting our own lack of prudence with his calls in *De Architectura* for using earthenware, instead of lead, pipes to bring potable water to homes (pp. 181, 189).⁴

Nearly 2000 years later, the eighteenth-century German Inspector General of Mines, Hans Carl von Carlowitz, coined the term *Nachhaltigkeit* (sustainability) when he decried the wasteful, short-termed exploitation of forests for silver mining and smelting and argued for a more circumspect approach to forestry, which called for logging only as much wood as could grow back in the same period (Grober 2010, pp. 80–82). These concerns were echoed more broadly and loudly by nineteenth-century intellectual reformers such as John Stuart Mill, Thomas Malthus, Harriet Martineau, and others who explicitly connected practical, real-world improvement of the human condition to conservation of nature and the flourishing of life on Earth (Lumley and Armstrong 2004). The effort of these reformers to ground well-being advances in a reflective analysis, which integrates an assessment of the human condition with the state of the planet, figures into a long-running, life-affirming stream of thought that runs through Buddha, Chuang Tzu, Ashoka, Saint Francis of Assisi—includes Thoreau, John Muir, and Aldo Leopold—and came of age in the contemporary era with Rachel Carson’s *Silent Spring* (1962), Gary Snyder’s *Turtle Island* (1969), Arne Naess’s deep ecology (Glasser 2011), Paul Shepard’s *The Tender Carnivore and the Sacred Game* (1973), Donella Meadows’ leadership on the Limits to Growth project (Meadows et al. 1972, 1992, 2004), and the work of many, many others.⁵

Building on this wider concern for the future, Joel Cohen (1995), in *How Many People Can the Earth Support?*, reviewed more than 65 peak population estimates, dating back to Antoni van Leeuwenhoek’s 13.4 billion in 1673, and concluded, “it depends.” How many people the Earth can support depends on future events, many of which are beyond our control; natural constraints and processes, many of which we don’t

understand; values regarding the kinds of worlds we want, which are likely to change over time; and, most importantly, human choices, which are often fickle and ill-informed. But that's only part of the story.

Cohen contends that there are also three kinds of panaceas to address resource challenges: create a bigger pie, reduce the number of forks, and improve manners (1995, p. 17). Building on Cohen, I suggest that the more expansive and challenging goal of improving well-being for all rests on three, closely related factors:

1. **do more with less**—increase human productive capacities by employing new, “advanced” technologies (Brand 2010); re-imagine our approach to technology and design, as with the principles of biomimicry (Benyus 1997) and biophilic design (Kellert et al. 2008); rethink our approach to production and consumption by creating circular resource flows and eliminating waste (McDonough and Braungart 2002); or utilize more environmentally sensitive and accessible traditional and open-source, appropriate technologies (Hazeltine and Bull 2003; Pearce 2012),
2. **do better with less**—decrease human numbers, expectations, or both by slowing, and ultimately reversing, the rate of human population growth; decrease overall per capita consumption equitably; reduce profligate consumption; increase equity and vital consumption by the needy; end exploitation of humans and nature; and support the regeneration of biological and cultural diversity by acknowledging planetary and social carrying capacity limits (Rockström et al. 2009a, b; Raworth 2012, 2017), and
3. **elevate the common good**—reinvent how we define and measure quality of life, educate, plan, govern, allocate scarce resources, and re-produce culture so that human and planetary well-being are the ultimate metrics and the behaviors we most seek are incentivized and reinforced through well-thought-out and sophisticated “choice architectures” (Thaler and Sunstein 2009; Johnson et al. 2012).

Disagreement over competing models of sustainable development centers on how these three factors—*doing more with less*, *doing better with less*, and *elevating the common good*—are understood, what combination of the three is favored, and what practical strategies for driving change are advocated. If we trust in technology, we likely lean toward (1); if we believe that human behavior is malleable and swayed by

information, rules, institutions, mindfulness practices, and knowledge of our neurobiology, we probably emphasize (3); if we concentrate on avoiding carrying capacity limits—technological, biophysical, or social—and view them as hard constraints, we are apt to focus on (2).

Cohen (2010) subsequently explored a policy hypothesis that exploiting his three remedies to address resource challenges rests on the availability of effective problem solvers and this, in turn, requires making universal primary and secondary education available to everyone. He followed up this research with further work on the role of nutrition for pregnant women and infants, arguing that effective utilization of educational opportunities rests on the brain development of fetuses and young children (2010). While clearly correct, this line of reasoning, as becomes quickly apparent, reveals a slippery slope of other significant factors upon which taking advantage of educational opportunities also depends: peaceful societies, sufficient resources to invest in education, high quality teachers, adequate teacher training, institutions and educational policies that enable teachers to do their best work, families that value formal education and have the resources to support their children to devote the necessary time and energy, etc. This problem has a myriad of intertwined causes and there is no stopping rule for addressing resource challenges effectively—new challenges will arise and old, previously effective solutions will generate unintended consequences.

Whether our focus is limited to global resource challenges or directed at the more expansive well-being for all, transitioning towards sustainable, one-planet living requires that we embrace the “wicked” nature of such problems (Balint et al. 2011). As a class, wicked problems are intrinsically ill-defined, unruly, and daunting (Churchman 1967; Rittel and Weber 1973; Protzen and Harris 2010). There is no unequivocally correct formulation of wicked problems, so each stakeholder is apt to define them with their own unique spin. The relationships between the current state of affairs, some desired future state, and the most appropriate actions to reduce the discrepancy simply cannot be foretold in advance—at least not with any confidence or consensus. Consequently, no exhaustively describable set of potential solutions can exist and no single preferred solution, backed by incontrovertible good reasons can emerge. Wicked problems are simply not amenable to strict optimization by black boxes, however sophisticated, objective, and data-driven they might be. Wicked problems are not only resistant to optimization, they are impervious to “resolution” as we know it, because they have no

stopping rule. Furthermore, as with Cohen's problem of identifying the core requirements for creating effective problem solvers, every wicked problem can be seen as the symptom of another problem. Wicked problems also involve values that are frequently evolving, partly intangible, often contested, and sometimes competing. As with aiming to characterize the exact position and momentum of an atomic particle at any particular instant in time, attempts to rigorously define wicked problems become part of the problem. Under such conditions, the problem itself morphs unavoidably and analysts are constrained to courses of action that exclude potentially promising alternatives.

In short, true wicked problems, because of their complex and tangled roots, defy all efforts to fully specify their boundaries and ascribe their causes. They are often characterized by incomplete or seemingly contradictory knowledge, erroneous perceptions, and indeterminate scope and scale; multiple explanations and contested opinions regarding their solution; "solutions" that, because of the interconnected nature of the problems are temporary at best and have the potential to generate more and worse problems; and uncertain, potentially significant, economic, environmental, and social burdens, which are passed on to future generations, those most at risk, and nonhumans. To make matters even more challenging, only one of these elements needs to be present to make a problem wicked. And because every wicked problem is unique, evolving, and always partly wild, there is limited potential to learn directly by trial and error or generalize "solution" strategies from past practice in a literal sense.⁶ In the conclusion, I'll sketch my strategy for learning to come to grips with creating and maintaining sustainable well-being societies as a wicked problem, which I refer to as skillful muddling.⁷

For the time being, it's important to be able to differentiate between pseudo-wicked and true wicked problems, as one of the most difficult obstacles can be understanding the nature of the problem. To do so, I present a more general conceptual framework for categorizing four key problem classes—(I) Straightforward, (II) Formidable, (III) Manageable, and (IV) Wicked—based on two distinguishing features: the extent to which the problem is clear and well-defined and the extent to which solutions are well-defined, agreed upon, and the character of change that has been identified. Understanding these four problem classes will help us to identify and elucidate appropriate solution pathways. New insights, information, and understanding can warrant efforts to "tame" or reduce wicked problems to manageable, formidable, or

straightforward problems. Sometimes these bear fruit. In such cases, the problems were pseudo-wicked. True wicked problems, however, cannot be simulated—their interactions are too complex and their relationships are too poorly understood and too uncertain to be modeled. As with building a giant dam, creating national education policy, or predicting the effects of the Trump administration, ascertaining the full consequences, many of which are co-evolving over time, counterintuitive, unforeseen (and possibly unforeseeable), long-lived, or irreversible, is only possible by experiencing them (Fig. 2.1).

The previous discussion bears significantly on the guiding question for this Sitra project, “Education for a Changing World,” which asks, “How do we enable students, schools, and communities to become the building blocks of a sustainable well-being society?” On first blush this question seemed refreshingly straightforward or at least manageable, but

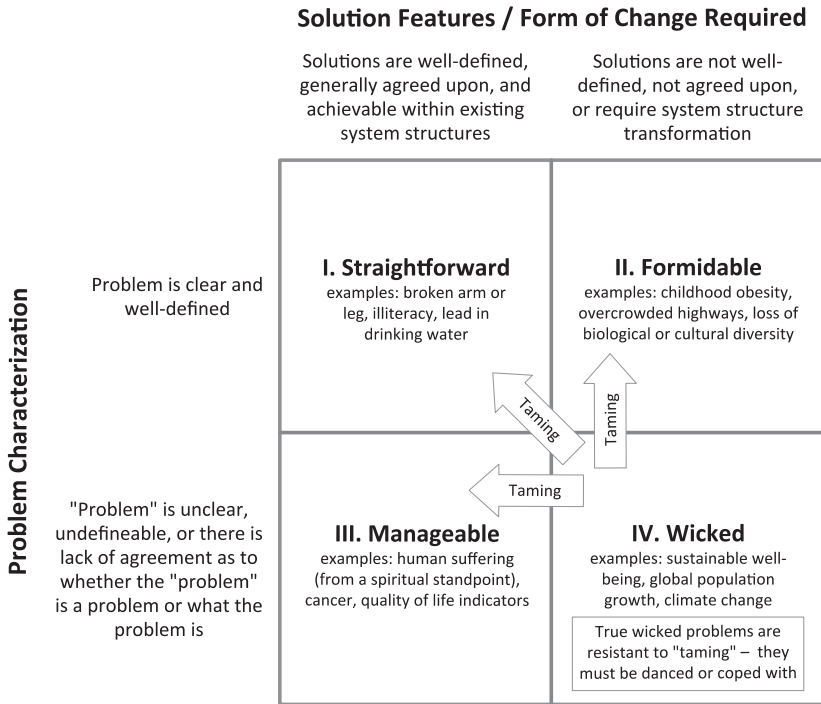


Fig. 2.1 Categorization of four key problem classes

this alluring ease did not last. Its wicked nature began revealing itself to me slowly and this, in turn, repeatedly stymied my many efforts to design a coherent and effective strategy for approaching this chapter. Sitra thought-leaders, Hellström et al., have done a groundbreaking job outlining a promising and inspiring framework for a “sustainable well-being society” (2015). Hellström et al.’s focus is on “advanced Western Societies” (p. 2). I, on the other hand, wanted to approach the guiding question from a more general species-scale, planetary perspective. I’m interested in broadly relevant, widely applicable strategies and innovations for improving well-being that can stand up to the full array of challenges (and opportunities) before our species, but without seeking totalizing and colonizing, homogenous solutions that lay claim to universal or transcendent truths. I’m also eager to flesh out some of the practical details, especially those around the learning foundations for creating and supporting sustainable well-being societies. It wasn’t until I began to thoroughly embrace the Sitra challenge with a wicked problem lens that a coherent approach, like a Rorschach inkblot, gradually emerged. Needless to say, I was left with an alarming array of questions that did—and still do—gnaw at me.

What do we mean by the phrase “sustainable well-being society” generically (but not too generically) and operationally? What are the broad dimensions and constituents of sustainable well-being? Do people agree on these dimensions and constituents? How does “sustainable well-being” differ from plain old “well-being”? Can the planet support many equi-valid, yet qualitatively different, sustainable well-being societies? And what about the diversity of lifestyles and equity challenges within these societies? Can we measure sustainable well-being, fluidly and on scales that are meaningful for individuals, communities, nations, etc.? If so, how *should* we be performing (and sharing) these measurements? What are the “building blocks” of sustainable well-being societies? How might we facilitate broad-scale learning about and via these building blocks in ways that create fecund environments for bridging the gap between concern about well-being and meaningful action (both individual and collective) to advance well-being for all? And, perhaps most importantly, why don’t we have a profusion of sustainable well-being societies now?

When taking a long view, the quest for well-being is seen as a wicked problem of extraordinary import, one that has bedeviled our species with its challenge and promise for millennia. Addressing this problem is vital

for *Homo sapiens* to come of age, to progress from carefree adolescence to a more deliberate path towards maturity. As Quinn (1992) asserted in the epigraph to this section, the task of advancing species-scale well-being for all is two-pronged. It rests on rooting out both the harmful complex of ideas that have brought about *unsustainable* well-being and sustained *unwell*-being and replacing them with more meaningful and compelling guiding metaphors that elevate the common good and are more appropriate for our times—the Anthropocene epoch, on a planet that is home to 7.5 billion people with diverse aspirations. The real challenge is not to identify what sorts of societies our human nature can support, but to explore, as Maslow (1993, p. 335) asserted, how good a human nature society can permit? In other words, will we allow our “better angels” to reveal themselves and flourish? All of these questions will be taken up in this chapter, but for the time being I must focus on the last two—and explore the deep roots of how the current, broader sociocultural-economic system came to be and how it has become conservative, reproductive, and a powerful counterforce to creating sustainable well-being societies.

THE ROOT CAUSES OF SUSTAINED UNWELL-BEING AND UNSUSTAINABLE WELL-BEING: METANARRATIVES AND GUIDING METAPHORS

Sapiens regime on earth has so far produced little that we can be proud of... [D]id we decrease the amount of suffering in the world? Time and again, massive increases in human power did not necessarily improve the well-being of individual Sapiens, and usually caused immense misery to other animals... Moreover, despite the astonishing things humans are capable of doing, we remain unsure of our goals and we seem to be as discontented as ever... We are more powerful than ever, but have very little idea what to do with all that power. Worse still, humans seem to be more irresponsible than ever... Is there anything more dangerous than dissatisfied and irresponsible gods who don't know what they want? (Harari 2015, pp. 415–416)

I agree with Harari that we humans have often used our tremendous power irresponsibly and that well-being improvements have been spotty, inequitably distributed, and frequently at the cost of nature. Despite an enormous, accelerating upsurge of awareness, modeling capacity, and

causal insight over the last 50 years, we have seen little tangible, enduring progress and very few efforts to adapt human production and consumption, education, or governance to fit what nature and the planet can afford and still flourish (Glasser 2016). Even with many promising global environment and sustainability initiatives—the 1972 United Nations (UN) Conference on the Environment, the 1992 UN Earth Summit, and the two subsequent UN Rio+ events in 2002 and 2012—and a parallel set of education for sustainability events—creation of the Environmental Education Programme at the UN Environment Programme in 1975, which was followed by the UN Decade of Education for Sustainable Development (ESD) in 2005 and the launch of the UN Education, Scientific, and Cultural Organization (UNESCO) Global Action Programme on ESD in late 2014—global trends in quality of life, climate change, biological and cultural diversity, environmental quality, and equity are mostly worse or improving very slowly (Abdallah et al. 2009; Gresh et al. 2006; Prescott-Allen 2001; IPCC 2014; Smil 2011; Steffen et al. 2015; Steffen et al. 2005; WWF 2016; MEA 2005; Rockström et al. 2009a, b; Stiglitz et al. 2010; Wilkinson and Pickett 2011; Sivard 1996). On the other hand, global military expenditures, which represent 2.3% of global GDP, are holding steady (Perlo-Freeman et al. 2016). These military expenditures are now in excess of the production of all but the top nine GDP nations. Yet only 0.5% of global military expenditures go to peacekeeping (Sambira 2017). There seem to be some misplaced priorities here.

At my worst, I question the sincerity of commitments to sustainable development and education for sustainable development—and wonder, like Harari, if we have made any real progress toward catalyzing a paradigm shift in action toward advancing well-being for all. We have come to enshrine anthropocentrism, individualism, exploitation of humans and nature, and unfettered economic and technological growth into decontextualized, taken-for-granted root or guiding metaphors. These metaphors forged the status quo into being and continue to guide and perpetuate it. Taken together, they form the four cornerstones of what I refer to as the Dominant Metanarrative, which came into being both slowly and spontaneously, through accretion, in an unplanned manner. The Dominant Metanarrative is the creation of a young, impetuous, highly intelligent, and opportunistic species testing its wings in an abundant and resilient world with low population, low population density, and low resource demands. Yet, in the age of the Anthropocene—where these conditions clearly no longer hold—we continue to take these four

guiding metaphors on blind faith and let them serve as tacit design principles for our societies.

That said, I am not so dismissive, fatalistic, or gloomy as Harari. In the midst of unfathomable wealth and poverty, erosion of ecosystem services, ennui, and loss of biological and cultural diversity, I believe our species also has a lot to be proud of and a lot to work with. Harari's comments skirt dangerously close to what primatologist Frans de Waal refers to as the Veneer Theory, which views human kindness "as a charade and morality as a thin veneer over a cauldron of nasty tendencies" (2013, p. 34). We embrace the dominant guiding metaphors and then code them into our laws, policies, and institutions, perhaps naively but not without dissent, as the previous section illustrated. We are also learning that the choices we make are also frequently the result of the kinds of rules and institutions we construct (Ostrom 1990) and the way the choices are presented to us; they are often more a function of what Thaler and Sunstein refer to as "choice architectures" than our values or a methodical analysis (2009). There is no reason to believe that they are coded into our DNA or somehow written into our "human natures." Drawing on decades of social cooperation and altruism research with our closest primate relatives, de Waal argues by analogy that morality and "the self-control needed for a livable society, is built into us" (2013, p. 2). Using functional Magnetic Resonance Imaging, James Rilling and colleagues demonstrated a neural basis for social cooperation that may result from "labeling cooperative social interactions as rewarding, and/or by inhibiting the selfish impulse to accept but not reciprocate an act of altruism" (Rilling et al. 2002, p. 403). Yet there are also powerful counterforces, as Harari points out. These counterforces gained momentum as social organization evolved and local rules of reciprocity and reputation based on intimate association foundered. "[I]t wasn't God who introduced us to morality" de Waal argues, we put God "into place to help us live the way we felt we ought to" (2013, p. 220).

My fundamental premise is that the human potential to learn, assess, reflect, mature, and flourish—as both individuals and as a species—is limitless. Human beings have prodigious underdeveloped and underutilized capacities—"intelligences" in Howard Gardner's sense (2004, 2006). In particular, our capacities to empathize with others and identify with all life forms, make the "common good" the meter stick for decision-making, learn how to exercise restraint and limit exploitation by respecting biophysical constraints in ways that are fair and equitable to all

humanity, species, and future generations, and appreciate that progress is contingent, has no bound. We don't live in a world of scarcity; we live in a world of abundance, but one where the vision of advancing well-being for all can only be realized by honoring biophysical, behavioral, neurobiological, and social constraints (Raworth 2012; Kahneman 2013; Thaler and Sunstein 2009; Ariely 2010; Rockström et al. 2009a, b; Glasser 2016). And this requires taking back responsibility for our future—we cannot leave it to the invisible hands of Gods or blind faith in progress.

Despite the message of limitless growth encoded in the Dominant Metanarrative, progress is not inevitable. As Maslow so wisely pointed out, “Good human beings will generally need a good society in which to grow” (1993, p. 7). This means having guiding metaphors that consciously and deliberately code for the actual state of the planet and human quality of life and integrate these with our highest human aspirations to advance the common good, a nuanced understanding of our neurobiology, and a rich understanding of how we came to behave as we do. The enemy of sustainable well-being societies is grand narratives and guiding metaphors that substitute curiosity, identification with all life, rigorous evaluation, reflection, responsibility, and effective corrective action with misguided perceptions, dogma, snap judgments, and wishful thinking. By exploring the origins of consciousness, we can investigate the roots of the Dominant Metanarrative and how it took hold—and hopefully learn to make wiser, more deliberate decisions about the guiding metaphors and choice architectures that shape our actions.

The gift of consciousness and the potential for social learning⁸ and widespread innovation through cultural transmission was made in and by nature. This is the basis of ecologist E.O. Wilson's assumptions about biophilia as “the inborn affinity human beings have for other forms of life, an affinity evoked, according to circumstance, by pleasure, or a sense of security, or awe, or even fascination blended with revulsion” (1994, p. 360). Today, intimate, personal knowledge of the environment, at least in most rich, Western nations such as the United States, is at an all time low (Louv 2005). According to Wilson, however, our spirit is woven from, and hope rises on, the currents of our innate identification with life and lifelike processes: “To the degree that we come to understand other organisms, we will place a greater value on them, and on ourselves” (1984, p. 1).

But how do we come to better understand others and ourselves? Where do these capacities originate? What, exactly, are they and how

do we learn to foster and leverage them as individuals and as a species, especially as we separate ourselves further from nature and each other? The Buddhist monk, Thich Nhat Hanh, developed a notion parallel to Wilson's, albeit one that takes practice. His concept of "interbeing" is the idea of fluidly and spontaneously seeing ourselves in others and all things—and them in us (2009, pp. 3–4). Interbeing gives rise to the awareness that there are no independent selves or things. You and I are in this paper or computer monitor along with the logger or the clean-room worker that made them possible. So is the sun, which drove the hydrological cycle by evaporating the surface water that condensed into clouds and eventually fell as the precipitation that nourished the trees, hydrated the workers, and washed the paper fibers or the integrated circuits. All things and all phenomena are connected and interdependent; the same ephemeral life force courses through all of us. Interbeing softens us to see our place on the planet and our relationships to nature and each other differently. It can and must be cultivated through practice (although reading this might just begin to shift your perspective).⁹

The psychologist of consciousness Robert Ornstein and ecologist Paul Ehrlich, in their *New World New Mind* (1989, p. 4), maintain that "many of the predicaments of our society come about from the way people respond to, simplify, and, ultimately, 'caricature' reality in their minds"—to how we perceive nature and ourselves. They contend that evolution favored "ancestors with limited perceptions and quick reflexes" (1989, p. 17). The old world that "made" our contemporary brains, they contend, was essentially static. The mind evolved to register—and respond to—dramatic short-term changes of immediate, personal consequence. There was no fundamental need for early humans to develop acute perceptions for detecting long-term, subtle environmental change or the sorts of collective responses that these problems often entail today (1989, pp. 29–30). While I agree with Ornstein and Ehrlich that the central issue facing humanity today is learning how to update our caricatures of reality (grand narratives) and make them better match both our highest aspirations and fit our times, the world protohumans perceived—especially without the gift of consciousness and symbolic communication—must have appeared highly varied over space and, in some locations, by season.

The human origins anthropologist, Rick Potts, in *Humanity's Descent* (1996) explores this idea further. He argues that the period in which much of our essential contemporary neurological "hardware" came into

existence was a time of unusual and exceedingly rapid climate variability. This favored an alternative form of selection, not referred to by Darwin. Potts and others refer to this as “variability selection,” an evolutionary foundation and proclivity for detecting, responding, and adapting to environmental change (including that which is relatively subtle from the perspective of an individual human lifespan).¹⁰ What became protohumans didn’t simply descend from the trees and walk out onto an open savannah. They learned to move fluidly between shifting forests and savannah in a complex, dynamic landscape. And the reward for learning about subtle environmental change was an enhanced survival potential.

Approximately 100,000–55,000 years ago (YA), *Homo sapiens* were probably anatomically and neurobiologically similar to contemporary humans. From a behavioral perspective, however, they were most likely similar to Neanderthals and other nonmodern humans (Klein 2009, p. 741). In Southern Africa, during the period from 70,000–50,000 YA there was a dramatic drop in temperature, sea level recession, and drought. Key protein sources, inland prey and shellfish, became scarce. Early humans, perhaps a band of only 10,000, were on the brink of extinction (Wells 2003). The survivors, however, were part of an innovative burst 50,000–40,000 YA, which enabled humans to carpet the planet. These survivors are believed to be the ancestors of every human living today. Genetic tracing of Y-chromosome mutations from people dispersed around the planet has now led to widespread acceptance of this “Out-of-Africa Hypothesis” (Wells 2003; Klein 2009). But what were the innovations and what made this disruptive change or “Great Leap Forward” possible?

The unique innovations included: burgeoning in the diversity, standardization, and rate of technological improvement of artifact types—including bone tools and fish hooks; broader and more efficient exploitation of food resources; transportation of stone, highly desirable for tools, hundreds of kilometers; ceremony, ritual, art, and personal ornamentation; and increased population densities (Diamond 1992, pp. 32–57; Wells 2003, p. 85; Klein 2009, p. 742). Many believe this bundle of innovations, which significantly enhanced human fitness, to have been made possible by an unparalleled advance in language, symbolic thought, and communication (Klein 2009, p. 742; Diamond 1992). Harari refers to this collection of advances as the Cognitive Revolution (2015).

My conjecture is that these advances in symbolic thought and communication engendered new forms of consciousness and nurtured latent

capacities, which sewed the seeds for collective exploration (and reimagination) of the future. These advances created the opportunity for some early humans to begin contemplating three core issues, or questions, regarding the future—its *predictability* (What is our capacity to know the future?), *tractability* (What is our capacity to shape the future?), and *welcomability* (To what extent is the future inviting or inhospitable from the perspective of human interests and concerns?) (Rescher 1998, p. 232). After the Cognitive Revolution, humans were destined to inhabit both physical reality and, increasingly, an imagined reality of our own creation.

These advances sewed the seeds for what Rescher has described as the “three principal spheres of human endeavor,” knowing, doing, and evaluating (1998, p. 232). They also permitted the invention of collective foresight and large-scale cooperation. With the opportunity to ask questions about the future, seek meaningful answers together, and share the responses widely, rational planning of human action (or at least the guise of it) became both possible and profitable, even in a highly unpredictable world. Life no longer needed to be entirely ad hoc. What I refer to as our *adaptive* and *anticipatory* capacities could now be developed and unleashed on a scale heretofore unimagined.

These gains made it possible for humans to go well beyond considering the immediate consequences of individual short-term decisions. We were now able to use inductive logic, not to predict the fate of these decisions, but to create thought experiments by playing “what-if”—or, rather, “what-could” or “what-might be”—games by inventing scenarios, thinking up innovations, and considering the multiple consequences of collective actions relative to alternative courses of action. This mental modeling, which very early on leveraged our human capacities for integrating contemplation, experience, action, and reflection, ushered in the dawn of culture (Klein with Edgar 2002).

While our mental hardware is now essentially fixed—and has been since the Cognitive Revolution—it is also tremendously robust and malleable. Cultural evolution takes advantage of neural plasticity by permitting rapid, consequential “software updates.” In doing so it allows innovation to develop and spread independently from the relatively slow pace of genetic change. This robust capacity to develop and spread innovation is what made the Agricultural and Industrial Revolutions possible. Today’s tightly coupled, networked world permits even more rapid, global-scale transmission of new ways of learning, perceiving, thinking, expanding compassion, planning, and acting. Cultural evolution could,

for example, re-define long-held perceptions and views on nature and growth-based economics as well as re-rig laws and institutions.

But there is also a double-edged element to this notion of the gift of consciousness arising in and as a product of nature. The sophisticated leaf-shaped points characteristic of the Upper Paleolithic, which helped to secure a ready source of animal protein for our calorie devouring large brains (they consume 20% of our caloric intake and only represent about 2% of our body weight), were almost certainly implicated in cases of late Pleistocene megafauna extinction (Martin 1990; Martin and Klein 1984). Similarly, while the advances of the Agricultural Revolution allowed more food to be produced per unit area, which resulted in rapid population growth, denser populations, increased technical innovation, specialization, and the invention of luxury goods, these advances came at the cost of healthier diets, leisure, varied work lives, more equitable societies, and an intimate connection with all of nature (Sahlins 1972; Shepard 1973; Diamond 1997; Harari 2015).

The emancipatory, intellectual foundation of the Industrial Revolution, the Enlightenment, rests on what Rescher refers to as “tendency optimism” (1998, p. 240)—regardless of the current state of affairs, things will improve in the future. The Industrial Revolution helped accelerate the rise of individualism, specialization, conformity, and exploitation of humans and nature that began with the Agricultural Revolution. And while it brought unprecedented increases in productive capacity, standard of living, life expectancy, and infant mortality, these advances came at the cost of increased pollution, inequity, and the breakdown of family, community, and nature. With the proliferation of economies based on fossil fuels, growth, profit, and exploitation, these trends accelerated and many of the functions once reserved for families and communities were unwittingly, and unsuccessfully, transferred to states and markets.

While there is unlimited potential for human development, there are limits to growth (Meadows et al. 2004; Rockström et al. 2009a, b; Raworth 2012). Uncritical, unrestrained expansion of human populations, economic systems, production, technology, material consumption, specialization, and exploitation of the environment ultimately bring consequences (mostly unintended and often unforeseen, although generally not unforeseeable) that are inimical to a fuller realization of our human potentials. Such views stand in stark contrast to the core, taken-for-granted tenet of the Enlightenment—that economic progress, scientific progress, technological progress, and social progress are the inevitable

byproducts of the application of reason and all reinforcing. Tendency optimism does not hold in practice, however. All of the components of progress are contingent. Couplings most certainly exist, but their relationship is frequently inverse and the benefits and costs are often not distributed uniformly or fairly (Wilkinson and Pickett 2011). The scale and character of any couplings are determined by the interplay of biophysical constraints and the social systems, institutions, and rules we make. From my perspective in the Anthropocene, the core tenets of the Enlightenment and Neoclassical Economics are both untenable and in desperate need of rethinking.

The processes (technical and social/normative) that we create to help us distinguish between random environmental signals and meaningful information, the information we choose to collect, the methodologies we create to make sense of this information, the strategies we develop to make this information accessible in a timely, undistorted fashion (or not), and the ways in which we act on it all matter. Rescher (1998, p. 240) refers to this form of conditional characterization of our future possibilities as “prospect optimism.” The state of affairs will only get better, *if* we do the right things in the right ways. Rising to our potential as a species, allowing the rest of the world—especially the poor, the disenfranchised, future generations, and nonhumans—to thrive and flourish, will necessitate a radical departure from present ways of life in most parts of the world.

We’ve had a nearly 500-year run of profound and expansive growth of data, information, and knowledge without a corresponding expansion of meaning, understanding, and wisdom. As the Dalai Lama has pointed out, “It is all too evident that our moral thinking simply has not been able to keep pace with the speed of scientific advancement” (2005). But this issue goes beyond coupling moral thinking to scientific advancement. It speaks to the age-old distinction between care and action. Our capacity for innovation frequently surpasses our realized collective abilities to recognize, understand, and cope with the consequences of our innovations—especially before they happen. Yet as the Norwegian ecophilosopher, Arne Naess, counsils, “Our species is not destined to be the scourge of the Earth. If it is bound to anything, perhaps it is to be the conscious, and joyful, appreciator of this planet as an even greater whole in its immense richness. This may be its ‘evolutionary potential’ or an ineradicable part of it” (2005, vol. 10, p. 187). The solutions for developing our full capacities as a species are not a matter of rising

above our biology—or cultural evolution—but a matter of learning to understand and work with them, and each other, to become more fully human. As Gandhi presciently noted, “The difference between what we do and what we are capable of doing would suffice to solve most of the world’s problems.” Meeting these exalted goals for our species, however, requires learning more about how we think, learn, and make decisions.

The psychologist and winner of the Nobel Memorial Prize in Economic Sciences, Daniel Kahneman, notes that when we think, our minds appear to employ two cognitive systems (2013). He refers to these “useful fictions” as System 1 and System 2. “System 1” functions effortlessly and spontaneously, drawing on familiar patterns, metaphors, instinct, intuition, and other associations. It is largely responsible for assembling and maintaining our models of reality and worldviews. System 1 makes rapid judgments, seemingly unconsciously, and can’t be shut off. Kahneman refers to this as “fast thinking.” “System 2,” on the other hand, requires conscious effort to invoke and attention to sustain. It demands intense, deliberate, and methodical focus. Kahneman refers to this more reasoned and analytic process as “slow thinking.”

When a situation calls for learning or action, the two systems interact constantly. The fast processing System 1 is extremely efficient. It tends to arrive at conclusions intuitively, based on heuristics (simple rules based on fragmentary models of reality). It’s the default mode. System 2 takes effort and tires easily. As a result, Kahneman contends, System 2 usually, and lackadaisically, defers to System 1. The key insight here is that we are highly influenced by our neurobiology and our surroundings in ways that we generally don’t consider and don’t fully fathom. The danger is that System 1 suffers from not knowing what it doesn’t know. System 1 derives its speed through simplification and leaping to conclusions freely and intuitively. As a result, it’s subject to a host of nonrational biases and interference effects (availability, representativeness, anchoring and adjustment, attribute substitution, etc.). The upshot is that as a species, we tend to overestimate our own rationality and vastly underestimate the role of chance (Kahneman 2013). When System 1 is well suited to the environment this marriage between the two systems generally functions symbiotically. When this is not the case, as when the Dominant Guiding Metaphors do not fit the current state of the planet or our highest aspirations, the relationship can be toxic or even antibiotic.

So why go all the way back to the origins of the Cognitive Revolution when exploring the learning foundations of sustainable well-being societies? Because from a System 1 perspective, Harari's caricature is correct—we don't really know who we are, what we're doing, or why we do what we do. We tend to be overly optimistic and overly generous about our own knowledge. We anchor present judgments in a past that no longer exists and likely bears little relationship to a future that is highly uncertain. Our vast and sometimes dangerous oversimplifications can result in giving our assumptions of knowledge much greater credence than they deserve. The upshot is that our minds habitually contradict themselves, distort data and our own expertise, and mislead us. We can, however, no longer afford to do planetary-scale, random prototyping of technical and social innovations on an ad hoc basis. While the future is highly uncertain, it's character is also highly dependent on the plans and decisions we make today.

The Cognitive, Agricultural, and Industrial Revolutions were adventitious. They were not planned or designed; they happened spontaneously and gradually.¹¹ Driven by System 1, they were the result of our species' unconscious opportunistic tendencies and ostensible biases towards perceived short-term benefit, self-interest, and silver bullets (leaping to innovative solutions before we really understand the problem we think we are trying to solve or whether the solution is really better than the status quo). Later, the acceleration of unfettered, decontextualized economic and technological growth further enshrined anthropocentrism, individualism, exploitation of humans and nature, and swelled inequity. While the taken-for-granted guiding metaphors of the prevailing Dominant Metanarrative (see Fig. 2.2) may have had significant relevance for leveraging new opportunities and advancing quality of life in the past, they are no longer consistent with: (1) the best scientific understanding of the state of the planet, (2) the most up-to-date insights regarding how our neurobiology, reason, and emotion interact to support decision-making, (3) the overarching goals of sustainable well-being societies, or (4) our survival as a species. Profound, disruptive change is no longer sporadic; it has become the status quo. Simply put, we can no longer afford to leave the ultimate goals of our species and major social decisions up to chance floundering and spontaneous decision-making. As the psychologist Mihaly Csikszentmihaly eloquently counsels, "The time for innocence ... is now past. It is no longer possible for mankind to

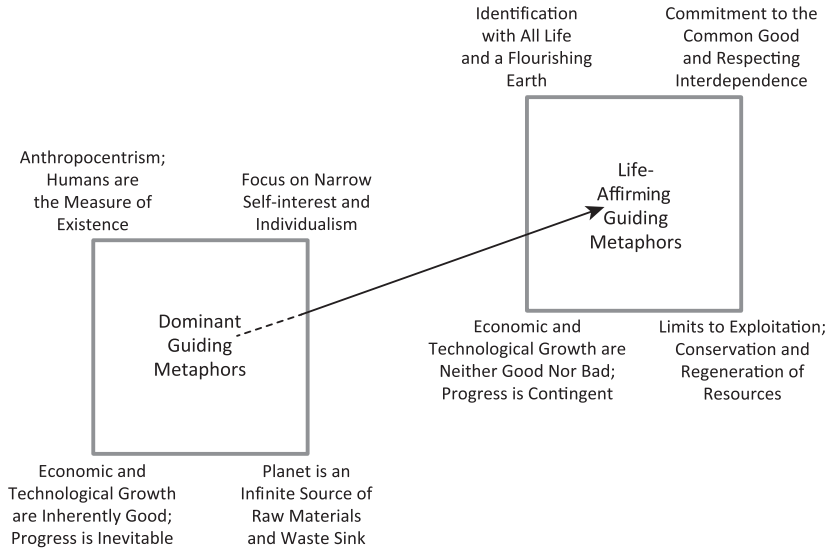


Fig. 2.2 Dominant and Life-affirming guiding metaphors

blunder about self-indulgently. Our species has become too powerful to be led by instincts alone” (1994, p. 18).

Our coming of age as a species, the Sustainable Well-being Revolution, is about taking responsibility for the awesome powers that we stumbled into. It’s about slowing down our thinking, as Kahneman advises, so that we can learn to use our prodigious powers to envision an alternative, more sustainable, desirable, and equitable future for all of the planet’s inhabitants. Unlike the previous three revolutions, this fourth Sustainable Well-being Revolution must be purposeful, anticipatory, fully conscious, and rapid. Its success rests on: (1) learning about the state of the planet and the roots of the status quo—including how and why we behave as we do; (2) understanding why many of the tenets and foundational, taken-for-granted assumptions of the contemporary era are no longer (or never were) relevant or appropriate; (3) envisioning a healthier, fairer, more meaningful future for all of the planet’s inhabitants (not perfection or a single, standard “ideal” state, but a world of manifold possibility, which can live up to our highest aspirations as a species); and (4) demonstrating activeness in relation to this knowledge and understanding by working to transform the present in radical ways and on an

unprecedented scale. It demands coupling our highest aspirations as a species to all of our individual and collective actions. And this, in turn, demands rich, transparent public discourse and massive personal responsibility to leverage the many examples of positive deviance (Parkin 2010) that are proliferating on the periphery, albeit mostly invisibly.

We have learned in this section that the habits that perpetuate global unsustainability are deeply ingrained and reinforced through taken-for-granted guiding metaphors, which act as a powerful counterforce to creating well-being societies. As David Korten has admonished, “When we get our story wrong, we get our future wrong. We are in terminal crisis because we have our defining story badly wrong” (2015, p. 1). In my view, visioning a healthier, fairer, more meaningful future for all of the planet’s inhabitants involves learning to change by changing how we learn. This is a species-scale process that consists of two steps: (1) employing System 2 to develop new, more Anthropocene appropriate and friendly heuristics and (2) rebooting System 1 with these new heuristics.

The first step involves engaging System 2 to confront outmoded perceptions and entrenched, maladaptive habits and beliefs. The importance of parsing out guiding metaphors and a metanarrative for global unsustainability—of going to the core of why sustainable well-being societies are not ubiquitous—is, I believe, central to dismantling the Dominant Metanarrative. It’s also crucial for identifying and characterizing a more appropriate and compelling Life-affirming Metanarrative and re-aligning our priorities, choice architectures, and institutions to foster sustainable well-being societies. Rebooting System 1 involves transitioning from the Dominant Metanarrative, with its diminishing relevance and ever more precarious foundations, to a Life-Affirming Metanarrative (see Fig. 2.2) that encodes our species’ highest aspirations—our better angels—into Kahneman’s fast thinking. Life-Affirming Metanarratives are not new; they have been a minority tradition for millennia, as I showed in the initial section, “[Well-Being Concern: A Long View on the Human Predicament and Progress](#)”. They elevate the common good and advance quality of life for all, equitably, in a manner that offers people the possibility of a compelling shared vision that is much more meaningful, desirable, credible, and sustainable than what they fear losing. Life-Affirming Metanarratives don’t serve as rigid, fixed ideals; they act as open flexible vantages from which to re-vision and reconstruct our future. They prepare us to skillfully muddle with wicked, real-world problems of unprecedented global significance by affording us a new “navigational compass” (de Geus 1999) that can help us update our

heuristics to guide the conscious design and reconstruction of educational, economic, consumption and production, and governance systems for the age of the Anthropocene.

Creating well-being for all has never been a chance process. Strangely, it's both more challenging and more possible in the age of the Anthropocene. Putting us on this path demands the wisest and most generous intention our species can muster. The question, "what is good for humans?" can no longer be asked in isolation with equanimity. It must be articulated within a set of nested, increasingly more general questions. "What is good for *all* humans?" and "What is good for the community of life on planet Earth at this point in history?" The bounds and context of how we conceive the human problématique and the concept of "common good" must be stretched. How we do and should relate to each other—including how we respond to our obligations and responsibilities and the opportunities available to us—is not simply constrained by our human relationships, narrowly conceived. Answering these questions today requires that humans address how we perceive, communicate with, and relate to the larger community of life and systems that both brought us into being and continue to provide for our sustenance and flourishing. And this, in turn, requires exploring what we mean by sustainable well-being societies in much more depth.

WHAT EXACTLY DO WE MEAN BY SUSTAINABLE WELL-BEING AND CAN WE MEASURE IT?

The twentieth century will be chiefly remembered by future generations not as an era of political conflicts or technical inventions, but as an age in which human society dared to think of the welfare of the whole human race as a practical objective. (Arnold J. Toynbee)

Toynbee was on to something. As a metahistorian and brilliant interpreter of the rise and fall of civilizations, Toynbee understood that cultural evolution is driven by challenges. He argued, "the greater the challenge, the greater the stimulus" and that there are no "excessive challenges" (1947, p. 140). While Toynbee was likely a century off, he recognized that humanity is nearing a point of self-awareness regarding our interconnectivity and interdependence. We are coming to learn, as Thich Nhat Hanh (2009) emphasized earlier, that the well-being of any individual is connected to the well-being of all individuals. Where

Toynbee's analysis was wanting, however, was in not recognizing that human well-being is inextricably bound to and constrained by the well-being of life on Earth. There's a hierarchy. Despite the force of the Dominant Metanarrative, people seem to be slowly coming to learn and appreciate the role we all play in determining the fate of our species and, ultimately, that of life on Earth. Awareness of these challenges brings profound new responsibilities. Put very simply, sustainable well-being is a two-dimensional ultimate goal and process; it's about improving quality of life for all, equitably—now and into the future—while adapting human activity to fit what nature can comfortably provide (Glasser 2016, p. 56). For fixed production technologies and levels of per capita consumption, as human population goes up, the maximum sustainable draw on natural and human capital—which can be viewed as a key component of overall ecocultural resilience—must go down.

The cornerstone of the Fourth Revolution—the Sustainable Well-being Revolution—I argue, is this effort to integrate Toynbee's idea of daring “to think of the welfare of the whole human race as practical objective” with the recognition that any viable, long-term, practical organization of human cultures and economies must function safely within the constraints of our highest social goals, our neurobiology, and, most importantly, the environment, upon which we depend for both physical and spiritual sustenance. Continually improving well-being for all equitably, while reducing our overall draw on natural and human capital is the *summum bonum* of our species and the greatest challenge before it now (see Fig. 2.3).

As Costanza et al. (2014, p. 33) have noted, to get on this path we must craft a new vision for humanity:

The most critical task facing humanity today is the creation of a shared vision of a sustainable and desirable society, one that can provide permanent prosperity within the biophysical constraints of the real world in a way that is fair and equitable to all of humanity, to other species, and to future generations.

I have argued earlier that realizing such a vision rests on learning how to transition society from the Dominant Metanarrative, with its default vision of individualism, anthropocentrism, exploitation, and inevitable progress, to a Life-Affirming Metanarrative, based on commitment to the common good, identification with all life, conservation and

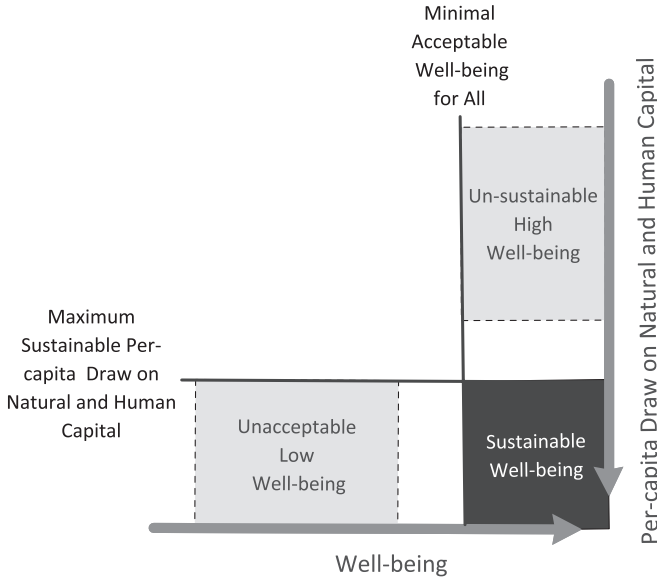


Fig. 2.3 Sustainable well-being as two coupled goals

regeneration of resources (natural and human capital), and contingent progress with limits. The Dominant Metanarrative, as we have discovered, is tremendously influential, socially reproductive, and resilient. We desperately need a compelling and coherent shared vision of “sustainable well-being” that has the power to supplant Quinn’s *Man Supreme* (1992, p. 249). While Costanza et al.’s characterization is remarkably crisp and “permanent prosperity” that is “fair and equitable” for all humanity, other species, and future generations represents a good baseline condition, sustainable well-being encompasses much more. On an ultimate goal level, sustainable well-being is an easy concept to grasp—and form a wide consensus around—but like peace, human rights, progress, and democracy, the devil is in the details. As with all truly wicked problems, there is no clear endpoint—we will always be able to improve well-being for some people and do it more equitably. Even more challenging, perhaps, well-being itself is ill-defined. There are, as of yet, no clear, well-accepted definitions of “well-being” or common descriptions of what constitute minimal, viable per capita draws on human and natural capital in different regions of the planet.

In my view, sustainable well-being can be conceptualized in at least three, potentially overlapping ways: (1) as the *summum bonum* of our species, (2) as a collection of philosophical and normative theories for thinking about the “good life” and characterizing well-being (these include a broad range of perspectives that span from Utilitarianism to good governance and mindfulness to capabilities, to name a few), and (3) as a set of frameworks and methods—or abstract structures—for “measuring” sustainable well-being that operationalize one or more of these theories. Since we cannot observe or measure sustainable well-being directly (McGillivray and Clarke 2006), we construct methods that include at least one proxy dimension (subjective or objective) and at least one corresponding metric or index for evaluating progress toward sustainable well-being.

While sustainable well-being is an intrinsic good in my conceptualization, it can be operationalized in many ways and in terms of many dimensions some of which are also intrinsically good—happiness and virtue, some which are instrumentally good—money and work-life balance, and others which fall somewhere in-between—knowledge, friendship, and capabilities. Sen’s capabilities approach (1993) is particularly interesting because it does not focus on what people have, how they live, or how they feel. It focuses on what they are able to do and be—their capabilities to function, such as working, resting, being literate, being healthy, etc. The *sine qua non* of Sen’s approach (1993) is that people have the freedoms (capabilities) to lead the kinds of lives they want, to do what they want, and to be who they want to be. Other objective measures include GNP, life expectancy, educational attainment, ecological footprint, and biological and cultural diversity, to name a few. While “objective” measures can be gauged with minimal reference to a person’s feelings or opinions, their inclusion (or lack thereof), how they are measured and weighted, and the level of aggregation that is employed is significantly influenced by the people designing the assessment method. Subjective measures such as life satisfaction, happiness, and positive emotions such as joy and pride or negative emotions such as fear and pain suffer from related assessment design challenges, but they are usually acquired by asking people to assess their own lives in surveys (Kahneman et al. 1999; Seligman 2011). Since they do not require the level of a priori selection of relevant indicators to cover what constitutes sustainable well-being, they have some significant benefits. Rigid distinctions between subjective and objective measures should not be drawn

too literally, however, as there can be significant overlap (Huppert et al. 2007).

Table 2.1 offers a sampling of ten well-being characterizations and the dimensions they employ to measure and assess progress. The diversity of dimensions and the combinations in which they are employed highlights the manifold ways in which well-being is conceptualized and measured. Table 2.1 also demonstrates that progress is being made towards expanding characterizations of well-being to reflect sustainable well-being.¹² Robert Prescott-Allen deserves significant credit for helping to initiate this trend (2001). The UN Millennium Development Goals and the more recent UN Sustainable Development Goals suggest that momentum is building (UN 2015), albeit slowly.

This list of 22 well-being dimensions is not exhaustive. More methods for measuring well-being exist and these incorporate other dimensions such as mindfulness (Sachs 2016), opportunity (Matson et al. 2016), and biodiversity abundance levels (WWF 2016). In addition, the Millennium Ecosystem Assessment correlated 4 main ecosystem services (Supporting, Provisioning, Regulating, Cultural) and their 15 constituents to four main dimensions of well-being (Security, Basic material for lives, Health, Good social relations) and their 13 constituents (MEA 2005, p. iv). It's also important to note that all of these dimensions are usually further divided into one or more constituent metrics or indices when well-being characterizations are operationalized into formal measures.

Following the framework of Costanza et al. (2009), the ten well-being characterizations in Table 2.1 can be separated into four categories: (1) indices that employ GDP or other income-based measures (Gross National Happiness, GDP, OECD's Compendium, Prescott-Allen's Human Well-being Index, Rath and Harter's Five Essential Elements, UN HDI, World Happiness Report); (2) indices that attempt to correct GDP, such as the Genuine Progress Indicator; (3) composite indices that include GDP or other income-based measures (all of those in the first category except GDP); and (4) composite indices that do not employ GDP or other income-based measures (Happy Planet Index, Prescott-Allen's Ecosystem Well-being Index, Seligman's Flourishing). It should be noted that some overlap will exist among these categories. In addition, not all indices are equally accurate or robust and not all composite indices incorporate environmental and sustainability considerations. While the same labels are often used for the dimensions of different well-being characterizations, it is not clear that they are always used in the same ways or mean the same things.

Table 2.1 Ten selected well-being characterizations and their dimensions

| <i>Characterizations</i> → <i>Dimensions</i> ↓ | <i>Bhutan's gross national happiness, 2016</i> | <i>Gross domestic product</i> | <i>Happy planet index, 2016</i> | <i>OECD's compendium of well-being indicators, 2011</i> | <i>Prescott-Allen's ecosystem well-being index, 2001</i> | <i>Prescott-Allen's human well-being index, 2001</i> | <i>Rath and Harter's fine essential elements, 2014</i> | <i>Seligman's flourishing, 2011</i> | <i>UN Human development index, 2016</i> | <i>World happiness report, 2016</i> |
|--|--|-------------------------------|---------------------------------|---|--|--|--|-------------------------------------|---|-------------------------------------|
| Career/ Employment/ Meaningful and dignified work | | | | ✓ | | | ✓ | ✓ | | |
| Community A— personal security, livability, vitality | ✓ | | | ✓ | | ✓ | ✓ | | | |
| Community B— frequency and quality of social connections/ Social support | | | | ✓ | | | ✓ | ✓ | | ✓ |
| Cultural Diversity and Resilience— avenues for self-expression, creativity, and spiritual growth | ✓ | | | | | ✓ | | | | |
| Educational attainment and knowledge base | ✓ | | | ✓ | | ✓ | | | ✓ | |

(continued)

Table 2.1 (continued)

| <i>Characterizations</i> → <i>Dimensions</i> ↓ | <i>Bhutan's</i> <i>gross</i> <i>national</i> <i>happiness,</i> <i>2016</i> | <i>Gross</i> <i>domestic</i> <i>product</i> | <i>Happy</i> <i>planet</i> <i>index,</i> <i>2016</i> | <i>OECD's</i> <i>compendium</i> <i>of well-being</i> <i>indicators,</i> <i>2011</i> | <i>Prescott-</i> <i>Allen's</i> <i>ecosystem</i> <i>well-</i> <i>being</i> <i>index,</i> <i>2001</i> | <i>Prescott-</i> <i>Allen's</i> <i>human</i> <i>well-being</i> <i>index,</i> <i>2001</i> | <i>Rath and</i> <i>Harter's</i> <i>five</i> <i>essential</i> <i>elements,</i> <i>2014</i> | <i>Schigman's</i> <i>flourishing,</i> <i>2011</i> | <i>UN</i> <i>Human</i> <i>develop-</i> <i>ment</i> <i>index,</i> <i>2016</i> | <i>World</i> <i>happiness</i> <i>report,</i> <i>2016</i> |
|--|--|---|---|---|--|---|--|---|---|---|
| Engagement/ Interest in learning new things | | | | | | ✓ | | | | |
| Environment A—Status of or demand on ecosystem support services | | | ✓ | ✓ | | | | | | |
| Environment B—Ecological Diversity and Resilience | ✓ | | | | | | | | | |
| Financial/ Income/Living standards and Material comfort | ✓ | ✓ | | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| Generosity (as measured by recent donations) | | | | | | | | | | ✓ |

(continued)

Table 2.1 (continued)

| <i>Characterizations</i> → <i>Dimensions</i> ↓ | <i>Bhutan's gross national happiness, 2016</i> | <i>Gross domestic product</i> | <i>Happy planet index, 2016</i> | <i>OECD's compendium of well-being indicators, 2011</i> | <i>Prescott-Allen's ecosystem well-being index, 2001</i> | <i>Prescott-Allen's human well-being index, 2001</i> | <i>Rath and Harter's five essential elements, 2014</i> | <i>Seligman's flourishing, 2011</i> | <i>UN Human development index, 2016</i> | <i>World happiness report, 2016</i> |
|--|--|-------------------------------|---------------------------------|---|--|--|--|-------------------------------------|---|-------------------------------------|
| Good governance/Civic engagement/ Absence of corruption | ✓ | | | ✓ | | ✓ | | | | ✓ |
| Health—Physical and mental | ✓ | | | ✓ | | ✓ | ✓ | | ✓ | |
| Housing | | | | ✓ | | | | | | |
| Inequality of outcomes/Equity—Household and gender | | | ✓ | | | ✓ | | | | |
| Life expectancy/ Healthy years of life expectancy | | | ✓ | | | | | | | ✓ |
| Optimism | | | | | | | | ✓ | | |
| Perceived freedom or opportunity to make life decisions/Social freedom | | | | | | | | | | ✓ |

(continued)

In fact, when it comes to specifying the detailed, disaggregated indices that represent a given dimension, they often look quite different, mean very different things, and are measured differently. These challenges are further exacerbated when it comes to addressing questions around whether or not and how to normalize, weight, and aggregate the various indices.

Under the Dominant Metanarrative, well-being is a reflection of progress that is measured by a narrowly defined, socially constructed form of “income” that is focused on economic throughput and is largely detached from the environment and its broader ecocultural context, with its many significant equity considerations (Stiglitz et al. 2010; Costanza et al. 2009; Glasser 2016). The main critiques of economic measures of well-being are that they: (1) reflect too narrow a view of human well-being—income is at best, only a means to well-being; it is not an intrinsic good in itself, (2) over estimate the role of growth in contributing to past improvements in material well-being (and under estimate the negative impacts of unrestrained growth), (3) underestimate the chasm between the environmental and equity challenges we face and the scale and character of our responses to them, and (4) fail to recognize the hierarchy discussed above—that any achievable sustainable human economy must be treated as a wholly owned subsidiary of nature. As the noted British economist, E. F. Schumacher commented (1989, p. 61):

[The modern Western economist] is used to measuring the “standard of living” by the amount of annual consumption, assuming all the time that a man who consumes more is “better off” than a man who consumes less. A Buddhist economist would consider this approach excessively irrational: since consumption is merely a means to human well-being, the aim should be to obtain the maximum of well-being with the minimum of consumption.

Schumacher would, I think, resonate with the *summum bonum* I described in Fig. 2.3. He is urging us to consider the point raised in (1) above, that human well-being is a multifaceted concept. It cannot be distilled into any single dimension as Rumi’s famous story about misperceiving the whole illustrates (Shah 1985). More than 700 years ago, Rumi told the tale of 3 men who sought to understand an elephant through touch alone. For the one that touched the ear, it was a fan; for the one that touched the leg, it was a pillar; for the one that touched the tail, it was a rope. This story shows, the sorts of blunders that can result from

mistaking parts for the whole. To measure sustainable well-being robustly, we will need a diverse array of subjective and objective dimensions and indices. Metaphorically, we can't create sustainable well-being societies unless we have living, flourishing elephants and this requires assembling the right pieces, in the right order, in the right ways—with openness, intention, and love. As Louis Mumford so wisely counseled (1956, p. 1152), “Of every invention, of every organization, of every fresh political or economic proposal, we must dare to demand: Has it been conceived in love and does it further the purposes of love?” Mumford goes on to say that much of what we do today would not survive this question and much of what we are capable of—much of what is tied to the highest goals of our species, to advancing well-being for all, to releasing our better angels—only becomes possible when we do fully embrace it.

For Hellström et al., “Sustainable well-being refers to the pursuit of the ‘good life’ within the Earth’s carrying capacity” (2015, p. 2). This definition embodies an outlook that parallels the one outlined in my *summum bonum*. Unlike improving well-being for all and reducing the per capita draw on human and natural capital (and the ecosystems services that are drawn from it), however, this good life focused definition poses some additional operational challenges by begging further questions: “What constitutes the ‘good life?’”; “What is the Earth’s ‘carrying capacity?’”; “How should we go about pursuing the ‘good life’—how do we make tradeoffs between pursuing the ‘good life’ and staying within the Earth’s ‘carrying capacity?’”; and “How should we identify and address equity issues?” Since we can’t measure either the “good life” or the “Earth’s carrying capacity” directly, the devil is in the details of how we conceptualize, simplify, and make these decisions and trade-offs. And this ultimately goes back to the age-old challenges of power distribution, participation, equity, opportunity, and governance, which are tied to our guiding metaphors. Rising to Toynbee’s challenge, daring to think about the welfare of the whole human race as a practical objective—and by extension the human race in relation to the flourishing of all life—demands that we learn to develop rich and robust assessments of where we are and measure progress in relation to a *summum bonum* for our species. This section explored three key issues around creating sustainable well-being societies. The first two are conceptual. They revolve around clarifying what we mean by the term “well-being,” and how it morphs when we precede it by the term “sustainable.” The third is substantial, it revolves around identifying a rich and robust set of determinants and constituents

of sustainable well-being and characterizing how they intersect and come together in concrete methods for measuring sustainable well-being.

Sustainable well-being measures are increasingly seen as a fundamental building block of sustainable well-being societies (UN 2014, 2015; OECD Better Life Initiative 2011; McGillivray and Clarke 2006; MEA 2005; Costanza et al. 2009; Helliwell et al. 2016). The methods are also increasingly contested, because measuring sustainable well-being is a wicked problem that involves our subjective, culturally mediated perceptions about the state of the planet, quality of life, its distribution, what constitutes progress—and how we achieve it, along with uncertain relationships between past and future cause and effect. Given the diversity of dimensions and plethora of methods for normalizing, weighting, and aggregating the various indices, I recommend that a diverse, international research team be created to explore, test, and evaluate collections of different indices with respect to the following six goals: (1) Relevance (robustness of data to reflect the two key dimensions of the *summum bonum* and their intersectionality around equity); (2) Breadth (ability to capture the broadest range of sustainable well-being concerns); (3) Measurability (data collection must be feasible, accurate, disaggregatable, time-bound, and facilitate the creation of national accounts); (4) Parsimony (capacity to reflect breadth with a small set of indicators); (5) Cost-effectiveness (given competing interests, gathering and maintaining data must yield a positive return on investment); and (6) Scale (robust measures must function fluidly on a variety of scales: individual, community, state, nation, and planetary).

What we choose to measure is ultimately a manifestation of what we care about. When well-being measures embody a clear, compelling *summum bonum* centered around improving well-being for all while reducing our overall draw on human and natural capital, they can act as a powerful multidimensional compass or dashboard for advancing sustainable well-being. By giving us a baseline and opportunity to assess progress, they can impact what we learn, how we learn, the goals and targets we set, and the policies, choice architectures, rules, incentives, and disincentives we create to meet these goals and targets. When done well—with intention and deliberation—they afford our species an opportunity to get off the path of blundering about self-indulgently by leveraging our capacities for planning and anticipatory and adaptive decision-making. Creating and adopting robust and exemplary sustainable well-being measures would represent a quintessential example of what Kahneman

refers to as “slow thinking” and serve as one of the highest accomplishments of our species.

THE CHALLENGE OF TRANSFORMATIVE CHANGE: CHANGING THE WORLD BY CHANGING OURSELVES

I am increasingly inclined to surmise that we presently find ourselves in a time of “interregnum”—when the old ways of doing things no longer work, the old learned or inherited modes of life are no longer suitable for the current *conditio humana*, but when the new ways of tackling the challenges and new modes of life better suited to the new conditions have not as yet been invented, put in place and set in operation. (Bauman 2012, p. vii)

B. F. Skinner, the father of Behavioral Analysis, presciently pointed out, “Most thoughtful people agree that the world is in serious trouble” (Skinner 1987, p. 1). He also asked, “Why is more not being done?” (1987, p. 1). As a Behavior Scientist, Skinner responded that the future does not exist; it can’t *act* on us. Yet humans, responding out of hope, fear, or just plain curiosity, have been creating surrogates with present-day consequences—models, scenarios, experiments, games, utopian and dystopian narratives, choice architectures, codes of conduct, policies, pleas, and laws—to foster anticipatory behaviors for centuries. This section is an inquiry into Skinner’s question, “Why isn’t more being done?” and a probe into the role of learning and formal education in creating and establishing Bauman’s “new ways.” As such, it’s an exploration into learning how to think, plan, and act in more anticipatory and adaptive ways. I call this approach to unearth and face the root causes of interconnected sustainability challenges, address their wicked nature, and usher in a new, Sustainable Well-being Revolution, skillful muddling.

Today, calls for new visions, revolutionary thinking, and transformative change that moves people and nations toward one form or another of sustainable well-being abound. Urgent appeals are not just coming from activists, academics, novelists, and NGOs. These calls are emerging from all walks of life—including the highest halls of governance—and they appear to be accelerating. Consider the following four statements from the United Nations (UN) and the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

Let us face the facts: the old model is broken. We need nothing less than a revolution in our thinking about the foundations of dynamic growth and the well-being of future generations.... [W]e must unite around a shared vision for the future. A vision for equitable human development ... a healthy planet ... an enduring economic dynamism that will carry us far beyond the troubles of today. (UN Secretary-General Ban Ki-moon in remarks to high-level thematic debate on The State of the World Economy and Finance and its Impact on Development 2012)

With our globalized economy and sophisticated technology, we can decide to end the age-old ills of extreme poverty and hunger. Or we can continue to degrade our planet and allow intolerable inequalities to sow bitterness and despair. Our ambition is to achieve sustainable development for all.... Transformation is our watchword. At this moment in time, we are called to lead and act with courage. We are called to embrace change. Change in our societies. Change in the management of our economies. Change in our relationship with our one and only planet. (UN 2014, p. 3)

Political agreements, financial incentives or technological solutions alone do not suffice to grapple with the challenges of sustainable development. It will require a wholesale change in the way we think and the way we act – a rethink of how we relate to one another and how we interact with the ecosystems that support our lives. To create a world that is more just, peaceful, and sustainable, all individuals and societies must be equipped and empowered by knowledge, skills and values as well as be instilled with a heightened awareness to drive such change.... Education for Sustainable Development (ESD) is about shaping a better tomorrow for all – and it must start today. (UNESCO 2014, p. 8)

The 17 Sustainable Development Goals and 169 targets which we are announcing today demonstrate the scale and ambition of this new universal Agenda.... [It] is a plan of action for people, planet and prosperity.... We are resolved to free the human race from the tyranny of poverty and want and to heal and secure our planet. We are determined to take the bold and transformative steps which are urgently needed to shift the world on to a sustainable and resilient path. As we embark on this collective journey, we pledge that no one will be left behind. (UN 2015, p. 1)

What do these bold, pioneering, and earnest pleas have in common? They assert that the model driving the status quo, the Dominant Metanarrative, is flawed. A revolution in thinking and acting is required. Transformative

change of every form imaginable is necessary—to our societies, our economies, and our relationship with the planet—or we risk a degraded, intolerably inequitable, bitter, and desperate world. If, however, we unite around a shared vision of sustainable development for all, “scale up” efforts to integrate sustainable development into education and education into sustainable development as outlined in UNESCO’s 2014 Global Action Programme (GAP), and create a firm foundation for implementing the ambitious UN Sustainable Development Goals (SDGs), we can redirect the future of humanity and improve well-being for everyone.

What these communiqués clearly got right, as Frank Fraser Darling commented long ago, is that “[h]uman well-being is an immense resource which can be squandered or marvelously regenerated” (as quoted in Sears 1965, p. 137). They identified the “problem space” well: Progress is contingent! Improving quality of life for all, into the future, rests on major rethinking and substantive changes to every aspect of our societies. Where I believe UNESCO and the UN stand on shaky ground, however, is in how robustly their “solution space”—including grand schemes such as the GAP and the SDGs—reflects the scale, character, and urgency of the situation, as characterized by their own rhetoric. After 45 years of UN environment and education meetings, declarations, and “years of this” and “decades of that”—with some significant progress and appreciable erosion—we must ask, are they digging deeply enough into the taken-for-granted assumptions that guide our choice architectures, institutions, production and consumption, development, economic, education, finance, and governance systems, and daily lives? If the UN (2014 and 2015) and UNESCO (2014 and 2015) are truly calling for a paradigm shift—a complete restructuring of what we stand for, how we function, and how we interact with each other—are they proposing to do the right things, in the right ways, at the right times and thereby apply appropriate leverage and pressure where it’s needed most? Are they releasing our better angels to leverage untapped capacities that invoke our highest aspirations?

In short, can the scale and character of change that the UN and UNESCO are calling for be accommodated by modifying existing choice architectures, institutions, production and consumption, development, economic, education, finance, and governance systems (first-order change) or are these system structures themselves, conservative, resilient, and reproductive and thus a powerful barrier to transformative change. From this perspective, the system structures, or rather the metanarrative guiding them, are themselves the most powerful barrier to transformative change. Throughout this chapter, I have been arguing that the later case

holds. The only way these prescient calls for transformative change can be realized, I contend, is by re-visioning our story (Korten 2015, p. 1). The fundamental flaw of the UN and UNESCO approach is that they are committing what the philosopher Gilbert Ryle referred as a “Category Mistake” (1949, p. 16). They are ascribing the capacity to create transformative, second-order change to first-order change strategies.¹³

As an example, consider how the approach to meeting the SDGs, which is embedded in chapter 36 of Agenda 21, still emphasizes basic literacy and education for all—“reorientation” instead of “re-imagination” of formal education. This approach falls into a trap identified by Donella Meadows (2014, p. 9). She commented that when we get involved in addressing big problems, with challenges around implementation, money, resources, explanatory models, information, and vision, we often go directly to implementation—and sometimes we get mired there. We ask “how do we...” questions before knowing that our information is accurate and our models are valid. And all too frequently, we embark on this process without knowing where we are going—without clear, well-articulated goals and a common, over-arching vision. In a related vein, John Dewey was concerned with leveraging the power and potential of education as a pathway for improving quality of life. Dewey saw education as the medium for creating social continuity through the renewal and “re-creation of beliefs, ideals, hopes, happiness, misery, and practices” (1916, p. 2). He argued that education—as a social process and function—can have no significant or profound meaning until we first clarify what kind of society we want (1916, p. 19). There simply are no shortcuts or silver bullets to replace effective visioning.

Realizing the kind of transformative, second-order change that the UN and UNESCO are calling for requires second-order system structure change and this, as I have tried to show, demands a new Life-Affirming Metanarrative. In a previous work, I have discussed this issue in the context of the distinction between Nominal and Robust Sustainability. Nominal Sustainability is ultimately limited to making the world less unsustainable, while Robust Sustainability, on first principles, is directed at catalyzing and nurturing a revolution in sustainable well-being for all (Glasser 2016). I am arguing that redirecting our species toward sustainable well-being for all rests on addressing the contingent nature of progress in the age of the Anthropocene. It rests on creating a new navigational compass for our species—one that earns *Homo sapiens*’ claim to wisdom and leverages our ingenuity and adaptability towards becoming a generous, creative, uplifting, and restorative force on planet Earth.

Learning how to create this external change, I contend, rests on learning to look inward first. As Tolstoy wrote, “Everyone thinks of changing the world, but no one thinks of changing himself.”

The challenge here is that deep change is deeply challenging. As I have discussed, it calls for an open, context-rich, long-view-focused exploration into the system structures and guiding metaphors that brought us to the present state—and drive the status quo. Changing the metanarrative also calls for exploring and cultivating interbeing. These explorations are fundamentally emotional, spiritual, or moral endeavors. As the Dalai Lama councils (2006, pp. 1, 2, 9):

There is so much bad news nowadays, such an awareness of fear and tension, that any sensitive and compassionate being must question the “progress” we have made in our modern world.... There is no doubt about our collective progress in many areas – especially science and technology – but somehow our advances in knowledge are not sufficient. Basic human problems remain. We have not succeeded in bringing about peace or reducing overall suffering.... A spiritual approach may not provide an overnight solution to all political problems caused by our present self-centered approach, but in the long run it will address the very basis of the problems that we face today, removing them at the root.

Daniel Goleman, in his book on the Dalai Lama’s vision for our world, argues that to get the human family on track, we need a new story that embodies this life-affirming, “spiritual approach”—“one that no longer incessantly repeats the tragedies of the past but faces the challenges of our time with the inner resources to change the narrative” (2015, p. 4). The next quotes, from the editors of a book by the Karmapa, one of the highest-ranking Tibetan Buddhist leaders,¹⁴ and Pope Francis, reiterate the flawed nature of the existing model, while speaking to the importance of three factors vital to creating sustainable well-being societies: (1) having a clear vision of our ultimate, species-scale goals, (2) breaking long-standing destructive patterns, and (3) having personal transformation provide a firm foundation for large-scale social transformation.

People all around the globe are deeply concerned about the state of the world and wish to change it, yet many feel unsure how to do so or where to begin ... His Holiness the Karmapa ... urges us to rigorously consider

human goodness as the basis for our work to transform the world.... Even as the Karmapa calls on us to build the world that we want to inhabit, he consistently reminds us that the renovation work actually starts within. He traces the very real problems that we see in the world – including rampant consumerism, religious intolerance, world hunger, and the degradation of the environment – to destructive emotions and habitual attitudes such as greed, anger, and selfishness. In this way, he points out that real social transformation is only possible when it includes personal transformation. (Derris and Finnegan in Dorje et al. 2013, pp. xv–xvii)

In this Encyclical, I would like to enter into dialogue with all people about our common home. In 1971 ... Pope Paul VI referred to the ecological concern as “a tragic consequence” of unchecked human activity ... and stressed “the urgent need for a radical change in the conduct of humanity”.¹⁵ ... Every effort to protect and improve our world entails profound changes in “lifestyles, models of production and consumption, and the established structures of power which today govern societies”.¹⁶ Authentic human development has a moral character. It presumes full respect for the human person, but it must also be concerned for the world around us and “take into account the nature of each being and of its mutual connection in an ordered system”.¹⁷ (Pope Francis 2015, pp. 4–6)

To safely pass through the “interregnum” and exit the quicksand of Bauman’s state of “liquid modernity”—a sort of purgatory where conventional practices no longer fit and the “new ways” haven’t fully arrived—we need to get our story right. To do this, we must acknowledge—and respond to—the gaping discrepancy between where we are as a species and where we want to go. Leon Festinger (1957) proposed cognitive dissonance theory to explain how our motives to maintain cognitive consistency can give rise to irrational and sometimes maladaptive behavior. According to Festinger, we hold many cognitions about the world and ourselves. When they clash, a discrepancy is evoked, resulting in a state of tension known as cognitive dissonance. As the experience of dissonance is generally unpleasant, we are motivated to reduce or eliminate it, and achieve consonance (i.e. agreement). The alternative to maintaining cognitive consistency through irrational and maladaptive behaviors is to utilize the desire for consistency to face up to both the cascading negative consequences associated with excessive levels of production and consumption, especially in economically rich countries and the growing inequality and abject poverty, that exist nearly everywhere (Wilkinson and Pickett

2011). In this manner, cognitive dissonance can be used to catalyze a “tipping point” around a fourth revolution that advances sustainable well-being for all. Understanding how we got on the present trajectory, as I have been arguing, is fundamentally important to supporting the personal transformation that is at the core of helping our species become a generous, creative, uplifting, and restorative force on planet Earth.

The designer Jessica Helfand contends that while we are “the architects of our collective future,” we must “embrace the hard-won capacities of the human soul” to truly advance civilization (2016, p. 206). I agree. It’s high time that we own this responsibility for changing ourselves with joy, intention, dignity, and grace. In the closing section, I sketch a series of heuristics for learning to skillfully muddle with the wicked nature of creating sustainable well-being societies and suggest that we may already be amidst a Sustainable Well-being Revolution.

CARE-FULL LEARNING: CREATING ROBUST FOUNDATIONS FOR SUSTAINABLE WELL-BEING WITH PAPER CUTS, PIN PRICKS, AND POSITIVE DEVIANTS

You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.
(R. Buckminster Fuller)

I started this chapter off with a reference to the “better angels of our nature.” Learning how to release them and our untapped capacities for advancing well-being for all starts with engaging Kahneman’s System 2 to acquire a rich understanding of the existing reality and the outmoded perceptions and entrenched, maladaptive habits and beliefs that brought us to the present. Fuller’s statement brings us back full circle to Quinn’s epigraph, which started the chapter. Today’s globalized, digitized, violent, inequitable, wasteful, and degraded world is driven by an outdated and faulty System 1. While I wholly concur with the insights of Fuller, Quinn, and Bauman about changing peoples’ minds by offering them more meaningful and compelling “modes of life,” I also recognize that the existing reality, the Dominant Metanarrative, is deeply entrenched. The people that benefit from it, the rich, well-connected elite, are not going to let their comfort slip away without a struggle—whatever their values and aspirations might be. That’s why I have been arguing that to build a secure foundation for a Sustainable Well-being Revolution, we

must simultaneously dismantle the Dominant Metanarrative—slowly and steadily, paper cut by paper cut—while replacing it with a more relevant and appropriate Life-Affirming Metanarrative.

Today, *Homo sapiens* are finally in a position to become successful architects of our collective future. This effort rests—perhaps now more than ever—on giving people something more meaningful and compelling than what they will lose. A new System 1, centered around affirming life and advancing well-being for all with the four new guiding metaphors described earlier, provides a promising start. It’s missing, however, more practical heuristics that can serve as signposts and guardrails for guiding and coordinating everyday behavior around sustainable well-being. While Daniel Kahneman (2013), his colleague Amos Tversky, and others like Dan Ariely (2010) have done brilliant work outlining System 1 biases and our rampant misuse of heuristics, they have yet to provide an alternative for updating and improving outmoded, biased, and faulty heuristics. System 2 cannot be relied on to rethink every decision—there is simply too much information to process and System 1, not knowing what it doesn’t know, is in no position to spontaneously create new heuristics that better fit the state of the planet and our highest aspirations. To function in our increasingly dynamic, information dense world, humans will, almost inevitably, be forced to rely more heavily on fast thinking. We desperately need more effective, simple rules and short-cut strategies that save time and effort by focusing our attention—and action—on what matters most today.

Luckily, there is another side to the story about misusing heuristics. Gerd Gigerenzer and his colleagues (1996, 1999, 2007, 2011), Gary Klein (2013), and others have devoted their lives to researching how people can use heuristics to gain insights that improve decision-making. Gigerenzer (2007, p. 18) sees heuristics as simple rules of thumb that draw on our brains’ evolved capacities. Klein argues that the key to improving decisions is to increase our good insights. For Klein, insights are shifts in understanding that can change perceptions, feelings, goals, and behaviors (2013, pp. 23–24). We increase insights by identifying new connections, coincidences, curiosities, contradictions, and through creative desperation (2013, p. 30). Overall performance in decision-making results from increasing insights while reducing errors and uncertainty (2013, p. 156). The Dalai Lama (2005, 2006), The Karmapa (2009, 2013), and Daniel Goleman (2015) center their recommendations for improving decision-making around expanding compassion, reducing suffering, and internal transformation. When considering global unsustainability, the

Dalai Lama attributes the absence of effective action to both lack of awareness about the deep roots and systemic causes of global unsustainability and lack of vision. His recommendation is to “think, plan, act”—to get a much better handle on how we identify, explore, and winnow options before taking action (Goleman 2015, p. 220).

Donald Sull and Kathleen Eisenhardt (2015) suggest four guidelines for developing successful heuristics. They should: (1) be small in number, (2) be tailored to the situations of users, (3) ideally apply to a single, well-defined activity, and (4) give concrete advice without being overly prescriptive. As an example, Michael Pollan (2007), a journalist who focuses on the intersection of nature and culture around food, condensed his dietary insights into three simple rules: “Eat food. Not too much. Mostly plants.” Like the Dalai Lama’s, these simple rules are neither exhaustive nor overly prescriptive, but they are direction setting. They clearly can’t be used to answer every dietary question we face, but they do quickly and easily help winnow a lot of options and focus our attention on three things that matter most: eating real, unprocessed food; eating in moderation; and eating low on the food chain.

My approach to addressing the challenge of creating sustainable well-being societies as a wicked problem focuses on what I call “skillful muddling.” It draws on the insights above by developing heuristics that blend reason and emotion to cultivate both honed intuition and careful analysis. A key inspiration comes from Donella Meadows (2014, p. 11), who argues that holding on to the vision reveals the path; there’s no need to judge the vision by whether the path is apparent. In this spirit, I offer the following very tentative and preliminary heuristics for skillful muddling to address challenges around creating sustainable well-being societies:

1. Honor Life: Create a clear and compelling vision of the sustainable world we’d love to live in.
2. Use the four Life-Affirming guiding metaphors to screen for inconsistencies and contradictions.
3. Confront the most brutal facts of our current reality—employ creative desperation.
4. Plan for one-planet living: do more with less, do better with less, and elevate the common good.
5. Have fun—employ a playful approach to questioning, reasoning, and analysis.

6. Be open to making new connections, spotting coincidences, and serendipity.
7. Learn and work with others and nature—there’s strength and resilience in diversity.
8. Embrace “failure”—take risks, experiment, prototype rapidly, assess honestly, learn constantly.
9. Develop meaningful, robust indicators for measuring sustainable well-being—and use them!
10. When considering any decision, ask if it honors and cultivates love.
11. Celebrate corrective action: align choice architectures and institutions with these heuristics.
12. Be bold, fearless, and humble in carrying out these commitments.
13. Act now!

If we apply these heuristics to a field such as education, for instance, I imagine that we would get a very different formal learning edifice. Consider the following perspective on education, as outlined by Hannah Arendt (2006, p. 193).

Education is the point at which we decide whether we love the world enough to assume responsibility for it, and by the same token save it from that ruin which except for renewal, except the coming of the new and the young, would be inevitable. And education, too, is whether we love our children enough not to expel them from our world and leave them to their own devices, nor to strike from their hands their chance of undertaking something new, something unforeseen by us, but to prepare them in advance for the task of renewing a common world.

In contrast to authors like Harold Bloom, who argue that education should be about cultural reproduction—about transmitting the great ideas and values of the past to the young—Hannah Arendt thought that education had a higher purpose. It should prepare young people for a life of engagement, transformation, action, and responsibility for themselves and the world.

When we apply these life-affirming heuristics to learning for sustainability challenges, we are directed to confront our cognitive dissonance head on by seeking out high-leverage, disruptive, and transformative changes that get at the deep roots of the challenges. We focus on first trying to

better to understand the problem of why sustainable well-being societies are not ubiquitous before outlining a solution or we try to develop what we mean by a “care-full” approach to learning that emphasizes appropriate content, effective pedagogy, conspicuous modeling, and meaningful assessment of the behaviors we seek. This approach results in learning how to change by changing what and how we learn. We might also initiate an effort to create Regional Centers of Expertise in Education for Sustainable Development (Glasser 2008) or a global collaborative to identify and explore Learning for Sustainability Core Competencies (Sterling et al. 2017; Glasser and Hirsh 2016) or games to facilitate learning for transformative change (Glasser et al. 2018), or even develop a framework for re-imagining and revitalizing formal education (Glasser 2004). We might also develop silo breaking, cross-institutional spaces for community members to learn and collaborate to rapidly develop, prototype, and test promising social and technological innovations that address real-world problems while reducing the demand on human and natural capital.¹⁸ Judy Wicks refers to such efforts, which improve conditions for people and the planet, as “doing well by doing good” (2013).

Meadows (2014) wisely counseled that when we envision, we must imagine, state, and articulate what we really want, not limit ourselves to what we think we can get. She urged us to create visions of the sustainable world we would love to live in, visions that could fulfill our deepest hopes and dreams (2014, p. 11). This idea of using compelling stories to extrapolate from the present to new, better—but as yet unrealized—worlds of our highest aspirations has been at the nucleus of what I refer to as Eutopian “imagineering” for thousands of years.¹⁹ It has also been at the heart of dystopian storytelling, which, while limited in scope, is directed at helping us to avoid the possible worlds of our worst fears and nightmares. Constructing new, life-affirming metanarratives, clarifying what we mean by sustainable well-being societies and how to measure them, and learning how to use broad heuristics to rapidly develop, prototype, and test promising social and technological innovations is also at the heart of this work. The chapter concludes with sanguine examples that illustrate how consequential, lasting change is already resulting from using these sorts of heuristics to create powerful new models that are displacing the existing model of reality, not by fighting it, but by making it obsolete—potentially ushering in a new, sustainable well-being revolution.

All over the world, in every corner of life, positive deviants—people who arrive at better, more inspiring solutions than their peers, despite

facing the same resource constraints, obstacles, and challenges—are creating real-world laboratories for sustainable well-being (Costanza and Kubiszewski 2014; Estill 2013; Hawken 2007; Parkin 2010; Steffen 2008; Senge et al. 2008; Suzuki and Dresser 2002). Millions of them are turning unsustainability challenges into opportunities—in ways that build on and support each other’s efforts. Unfortunately, I cannot begin to do justice to this revolution-making work in a survey paragraph. The citations that follow are superb examples of positive deviance to advance sustainable well-being. It must be noted, however, that they represent the tiniest tip of the iceberg of the superb work that is happening all over the planet.

Some people are using Jaime Lerner’s concept of urban acupuncture (2014) to create strategic, pinprick-like interventions to shift behaviors and catalyze positive change with minimal effort. Others are employing the field of social entrepreneurship, where the value proposition is centered around using innovation to improve quality of life for all instead of simply advancing profit (Bornstein and Davis 2010; Nichols 2006; Wicks 2013). Regardless of the approach people use, system structure shifting changes are being proposed and developed in every arena imaginable: biodiversity protection (Wilson 2016; Wuerthner et al. 2014), biomimicry (Benyus 1997), business (Anderson 2009; Chouinard and Stanley 2012; Honeyman 2014), climate change response (Hawken 2017), collective management of common property (Poteete et al. 2010; Ostrom 1990; Glasser et al. 2018), cradle to cradle production and consumption (McDonough and Braungart 2002), cultural diversity protection (Davis 2009), economics (Felber 2012; Raworth 2017), ecovillages (Weisman 1998), energy planning (Lovins and The Rocky Mountain Institute 2011), food and farming (Barber 2014), improving the resilience, prosperity, and sustainability of our communities (People’s Liberty 2017; The Oberlin Project 2017), living buildings (Thomas 2016; Kellert et al. 2008), microfinance (Yunus and Jolis 2008), permaculture (Hemenway 2015), public health (Farmer with Weigel 2013), sustainable urbanism (Farr 2008; Lerner 2014), teacher education (Hicks 2014), transition communities (Hopkins 2014), transportation (Foreman and Sperling 2014), urban rewilding and carbon sequestration (Sanderson 2013). In the language of Anwar Fazal, the pioneering developer of progressive, sustainability-oriented NGOs, “these islands of integrity, wells of hope and sparks of action must be welcomed, multiplied and linked...” (2017).

Much of what I have been arguing throughout this chapter is that a credible, widely shared vision of sustainable well-being societies has

been in process and gathering momentum for a long time. The “new model” Fuller, Quinn, and Bauman are speaking about has been forming before our eyes, slowly and deliberately, all over the world in diverse, diffuse, and democratic pockets of resistance. Because it is developing right before our eyes, however, no single individual can have the experience, perspective, or insight to see it as a vivid, coherent image.

I have attempted to outline an approach for increasing and accelerating the probability of success for a Sustainable Well-being Revolution, but as with all wicked problems there are simply too many moving pieces to speak with optimistic authority. The all too obvious truth is that I have no crystal ball. I have no way to assess or predict the viability of a Sustainable Well-being Revolution, but neither does anyone else. So how are we to deal with such uncertainty? Following the wisdom of Vice Admiral Stockdale, the highest-ranking U.S. Vietnam War prisoner, I have been arguing that we freely embrace the paradoxical duality of our situation (Collins 2001, pp. 83–85). We must never lose faith, never waiver in the belief that we will find a way to prevail and turn this situation into the defining moment of our species while simultaneously exercising the discipline to honestly and openly confront the most brutal facts of our current reality. From this perspective, as Václav Havel so wisely counsels (1985, p. 96),

... the real question is whether the “brighter future” is really so distant. What if, on the contrary, it has been here for a long time already, and only our blindness and weakness has prevented us from seeing it around us and within us, and kept us from developing it?

NOTES

1. Abraham Lincoln made the concept of “our better angels” famous in his First Inaugural Address. Its origins date back at least to Shakespeare, who in *Othello* used a remark by Gratiano, a Venetian nobleman, to refer to the enlightened and restrained human impulses that would keep him from seeking bloody revenge on Othello who had recently slain Desdemona. Twenty years before Lincoln’s Address, Dickens, in chapter 29 of *Barnaby Rudge* wrote about how the “shadows of our own desires” stand between “our better angels” and eclipse them. This chapter, in many ways, is an exploration into opportunities and strategies for liberating our better angels by shining a bright light on the “shadows of

our own desires.” I owe these insights about the origins of the phrase “our better angels” to a blogpost by Gene Griessman, “The Better Angels Of Our Nature.” <http://whatyousay.com/a-quotations-you-can-use-in-writing-charles-dickens-and-abraham-lincoln/> (accessed 19 May 2017).

2. For the purposes of this chapter, “quality of life” and “well-being” are treated as synonyms.
3. As an example, consider the early Sumerian version of *Gilgamesh in the Cedar Forest*, which predates the full Gilgamesh epic (Shaffer 1983). In this story, after exhibiting tremendous hubris slaying the forest protector Humbaba with his friend Enkidu, the Sumerian gods, in an effort to protect nature from the rapaciousness of humans embrace a democratic, decentralized model by returning the powers of protection to the trees, streams, and grasses. It is notable that in the full epic, Gilgamesh is also punished severely for this and other transgressions. Emperor Asoka’s conversion to Buddhism after his violent conquest of the Kalingas in 264 BCE, and his preaching of the Dharma through moral precepts such as doing good deeds, respecting others (including nonhumans), and practicing generosity, truthfulness, and purity—as documented in the Edicts of Asoka—provides another example (Nikam and McKeon 1966).
4. The recent crisis in Flint, Michigan over domestic water distributed to homes with frightening lead levels and the generally slow, ad hoc response by government officials, makes it all too clear that we have yet to adequately heed Vitruvius’ warning. For more details on the Flint water crisis, see Sellers (2016), Flint Water Study Updates (2016). On the positive side, the relatively rapid response by independent teams of scientists and activists to test water, identify the source of the problem, and identify practical, short-term solutions is quite hopeful.
5. For a rich discussion on the concept of ecological utopias, see de Geuss (1999). For a more general discussion of utopian thought coupled to real-world improvement in quality of life on this planet, see Glasser (2011), Schaer et al. (2000), Moos and Brownstein (1977), Sears (1965), and Mumford (1959).
6. In their classic description of “wicked problems,” Rittel and Webber (1973) argued that “In a wicked problem, there is no opportunity to learn by trial and error. Every solution is a one-shot operation.” While I agree with Rittel that every wicked problem is novel, and thus there is limited potential for generalizing, wicked problems do have common characteristics that lend themselves to skillful muddling via heuristics.
7. This work builds on a much earlier and less sophisticated effort I began to approach wicked problems, which I referred to as “strategic muddling” (Glasser 1998).

8. For an introduction to social learning that explores the meanings and purposes of learning broadly conceived and its connection to sustainability, see Glasser (2007).
9. The idea of learning interdependence and developing interbeing through the formal education system—and its pressing importance for our species—has been stated eloquently by Mihaly Csikszentmihaly (1994, p. 275): “Perhaps the most urgent task facing us is to create a new educational curriculum that will make each child aware, from the first grade on, that life in the universe is interdependent. It should be an education that trains the mind to perceive the network of causes and effects in which our actions are embedded, and trains the emotions and the imagination to respond appropriately to the consequences of those actions.” I concur and have built interdependence and interbeing into my work on Learning for Sustainability Core Competencies.
10. For details on the impact of the paleoclimate on human evolution and the concept of variability selection, see Vrba et al. (1995) and Potts (1996, 1998).
11. I owe this insight to a statement by William D. Ruckelshaus (Head of the U.S. Environmental protection Agency from 1970 to 1973), which is cited in Meadows et al. (2004, p. 265).
12. McGillivray and Clarke (2006, p. 5) note that the effort to integrate well-being and sustainability measures has a significant history that dates back to the late 1960s.
13. For a detailed discussion of first- and second-order change in relation to sustainability challenges, see Glasser (2004). For a deeper look into the meanings and origin of first- and second-order change, see Watzlawick et al. (1974).
14. The Seventeenth Karmapa, Ogyen Trinley Dorje, is the spiritual leader of the Kamtsang Kagyu tradition of Tibetan Buddhism and one of the highest-ranking lamas in Tibetan Buddhism. Born in 1985, he escaped from Chinese occupied Tibet at the age of 14 and now lives near his mentor the Dalai Lama, in Dharamsala, India.
15. Quote from Pope Paul VI, Address to FAO on the 25th Anniversary of its Institution (16 November 1970), 4: AAS 62 (1970, p. 833), as quoted in the *Laudato Si'*.
16. Encyclical Letter Centesimus Annus (1 May 1991), 38: AAS 83 (1991, p. 863), as quoted in the *Laudato Si'*.
17. John Paul II, Encyclical Letter Sollicitudo Rei Socialis (30 December 1987), 34: AAS 80 (1988, p. 559), as quoted in the *Laudato Si'*.
18. I refer to these “do tanks for thinkers” or “Sustainable Well-being Accelerators” as Community Sustainability Incubators. They are an idea that I have been developing for several years but have not published on yet.

19. Eutopia refers to a place of ideal well-being as a practical aspiration as opposed to utopia, which generally refers to a place of ideal well-being as an unrealizable abstract structure.

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CHAPTER 3

Sustainable Wellbeing Society—A Challenge for a Public Sector Institution

Jari Salminen

INTRODUCTION

This article employs research into the history of education to examine the opportunities available to the public-sector school system to promote sustainable development and wellbeing. Research in the United States and Finland has long recognised certain persistent problems in terms of bringing about development and change in schools. The article analyses the main structural factors affecting operating cultures within schools and conflicting factors that steer school operations. They are revealed by the debate surrounding the duties of schools, institutional structures and curricula, and they stretch all the way to pedagogical activities and pupils' own actions. Awareness of these tensions must be increased if the aim is to promote broad-based societal goals such as sustainable development and greater wellbeing in education. Educational policy statements, think-tank visions and broad curriculum objectives are unable to eliminate these persistent tensions built into education and the public-sector school system.

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In every state, public-sector school systems have formed as a result of a long historical development and, for this reason, they each have distinct characteristics. Changes in schools have coincided with broader societal and cultural changes in each state, as well as developments in economic activity and demographics. In spite of these differences due to state-level developments and society, every Western country has faced a very similar set of challenges in the development of its school institutions since the Second World War.

The accelerating development of society has given rise to a problem of tempo within schools: the need for continuous, comprehensive development and modernisation of operating modes. Changes in modern life and future expectations represent challenges to the implementation of school education in many ways. In 1999, James Gleick, an American non-fiction author and journalist, was considering the lives of ordinary Americans and remarked how everything was accelerating: love, life, speech, politics, work, TV and free time. And he is not alone in making that observation. Everything is subject to accelerating change: economics, weapons systems, construction, working life, the structural systems of society, cultural habits, norms and regulation, as well as physical and psychological conditions (Rosa 2009).

This Western pace of development has spread to all parts of life and all areas of the world. The history of the modern age is characterised by the acceleration of various technological, economical, social and cultural processes. Social scientists Hans van der Loo and Willem van Reijen (1992) have illustrated the pace of change by way of a 24-hour analogy. If the entirety of human development were condensed into a single day, more than 23 hours would have been consumed by the hunter-gatherer culture. Agriculture would account for four minutes, urban civilisations would get three minutes, and the modern world and its systematic education system would receive less than 30 seconds.

One common feature of Western development since the 1970s has been the intensification of efforts to solve large-scale, complex social problems and future challenges via school education. Attempts have been made to use schools to increase economic productivity, solve problems related to equality, integrate different cultural principles, make better citizens, promote health, and reduce traffic fatalities, juvenile delinquency, youth substance-abuse problems and obesity. A common feature of these constantly varying and diverse attempts to make a difference is the high frequency of failure. The positive effects have been often minimal,

short-term or even non-existent in practice (Sarason 1990; Tyack and Cuban 1995; Labaree 2010; Salminen 2012).

Many efforts to reform schools are “wicked problems” in nature— attempts to solve these are complex in many ways. From the perspective of planning based on a scientific worldview, solving these problems is prone to failure due to the complex nature of the problems. In their classic, frequently cited article of (1973), Horst Rittel and Melvin Webber, two American design theorists, outlined the features of wicked problems. According to them, science often works with “tame” problems. These can be precisely delineated and the conditions can be controlled. The process may be repeated, thereby enabling the results to be confirmed. However, societal issues, such as reforming school work to serve the objectives of sustainable development, cannot be definitively resolved. There are no objective answers to the question. It is a matter of social conditions that are almost impossible to control because not all of the variables in the process can be controlled—it may not even be possible for them to be identified. The phenomenon is unbounded, internally contradictory and constantly occurring under changing conditions. The selected solutions also give rise to new problems. The dynamic attained by a complex phenomenon is interactive in nature and this interaction is difficult to define even at the outset, often being non-linear, paradoxical and reorganising.

The fundamental task of education gives rise to two different and partially opposed approaches. In general it can be said that reformists consider school institutions to be a means of trying to change prevailing societal conditions, while traditionalists place a greater emphasis on the preserving function of education and culture. For this reason, public-sector school systems are forced to balance the contradictory forces of continuity and the future (change) at an accelerating rate. School education should reform tradition, societal and national values, and promote economic growth and competitiveness while preparing for future challenges in an increasingly complex and globalised, multicultural world threatened by the insufficiency of natural resources and the environment’s capacity for endurance. Various educational efforts and explanations have set themselves up to address this dilemma.

In this complex undertaking, promoting the goals of sustainable development and wellbeing is a major challenge for the school system, requiring a thorough understanding of the institution’s operations if real, lasting results are to be achieved. Promoting sustainable development

and wellbeing is a typical wicked dilemma. It is difficult to create a consistent and logical objective for this dilemma. In and of itself, the objective contradicts certain other fundamental objectives and historically developed structures of the school.

VAGUE GOALS DO NOT LEAD TO RESULTS

David Labaree (2010), a historian of education, has identified four systemic levels that form a hierarchy: the rhetoric, the institution, the teacher and the pupil. Efforts to promote the objectives of sustainable development and wellbeing come up against all of these challenges at different levels. Each of them has its own characteristics, actors and practices.

The top level, and the level furthest detached from the practical work of the school, is the *rhetorical level*. Reforms and new goals set for school usually originate here. The main actors are experts in various fields and professors, political and societally significant figures and lawmakers. Their leadership aims to promote a particular educational value, which is accepted as the new rhetorical aspiration to guide the school. The reformers' tools include a range of reports, policy programmes, strategy and vision papers, public speeches and scientific articles. However, in these various forums, it is very rare for clear and logical consensus to be reached regarding what schools should do and how the new objectives should be realised in practice. According to Stevenson (2007), there is an enormous difference between the political rhetoric of sustainable development and the educational practices of sustainable development.

Hannu Simola (2000), a Finnish educational sociologist, has defined a theoretical explanation of why public discourse on schools has become increasingly vague since the 1970s. In the US in particular, school reform has become a permanent part of school discourse—"steady work" as Elmore and McLaughlin (1988) put it. One reform follows another at a rapid tempo, and a new way of speaking replaces the old one before the previous reform has even been properly absorbed at the school level. In Finland, reform efforts have also constantly intensified since the 1970s.

According to Simola's research, four variables form the background of development rhetoric: the ethos of individualisation, the increasingly scientific approach to the field of education, the decontextualisation of discourse on education and the rationalisation of the objectives of curricula. Together, they form a way of talking about education that Simola

has named *the wishful rationalism*. This refers to particular types of quiet truth. They are often recognised without being noticed in subordinate clauses, by implication between the lines, and are often not explicitly justified. They are often taken for granted, beliefs passed down, highly familiar but poorly known, widely recognised but rarely identified building blocks of a particular way of talking.

The objectives of school education have become more individualistic in recent decades. For most Western school systems, it has been typical to develop school to cater for the individual needs of pupils and families. Labaree (2010) refers to this desire among US schools as a consumer—and market-driven change. This ideological aim has had an increasing effect on the work of schools since the 1990s. At the same time, the pupil's status and way of speaking about school have changed from traditional ideals of civic education towards a customer-oriented rhetoric that emphasises service capacity and performance. Charter schools and voucher models have rapidly altered the principles governing how education is arranged in several US states. This model, which favours individual school selection and enables schools to profile themselves and operate as profit-seeking commercial enterprises, has also been adopted in Sweden—particularly in the Stockholm region. In Finland, the development has not yet reached such an advanced stage but initial signals of a similar shift can already be detected in major cities. According to a study carried out by Sonja Kosunen (2016), middle-class parents in Helsinki and Espoo want to avoid disreputable schools and tend to look for alternatives for their children. These expectations also highlight the demand for more individualised service.

The emergence of a market for school education makes it more difficult to achieve various common and more general goals of civic education, such as promoting sustainable development. Such efforts are easy to formulate as part of development programmes and even as part of the curriculum, but are more difficult to implement in practical schoolwork in the form of consistent objectives. The conflict is exacerbated by more intense terminal evaluation procedures, which mechanically measure learning outcomes using a range of behavioural tests. Segregating schools into those with good reputations and those with bad reputations serves to accentuate the differences between schools. In such a competitive educational culture, it is essential for most families to primarily safeguard their own children's learning paths and subsequent career development by making the right choices. At the same time, schools

lose the ability to respond to wider societal and common objectives as they increasingly head towards models that cater for customer needs created by ever-changing markets and trends in a climate of intensifying competition.

Discourse on the rationalism of hopes has also led to a kind of spiral of reform. From the very outset, the requirements for school reform are set increasingly further from the actual conditions in schools and, for this reason, they tend to fail. That is how this talk of reform decontextualised from the reality of education constantly leads to new requirements for the development of education. A situation has arisen in which the temporal, material and mental resources available to schools are becoming increasingly blurred. School developers and parties who set new educational missions for schools no longer recognise the school's historically constructed nature, its group-oriented and compulsory character, and multitude of internal contradictions and boundary conditions within its operations. There is no longer any argumentation of the school *as a school* with realistic starting points. There is less discussion about what school reality is, but there is more and more talk of what it should be (Simola 2000).

However, development and new requirements are often justified using scientific arguments and with reference to research results. Has modern educational science itself fuelled these unrealistic demands for changes to school development and the belief in solutions to societal problems? As many researchers have shown, reform efforts often depict the school as a mechanical system that operates like a machine and that can be fed new system components to be used alongside the old ones without any compatibility issues (Salminen 2012). By operating in this way, consultants and school reformers reinforce talk of reform ever further. At the same time they promise to parties outside the school—particularly families—that schools will perform these tasks. This further strengthens a belief in the ability of educational institutions to solve current and ever-expanding future problems.

Changing schools so as to serve the goals of promoting sustainable development and wellbeing is typical of attempts towards the rationalism of hopes. The objectives of the reform are easy for most interest groups to accept on a general rhetorical level when it is neither necessary to precisely define the contents of the objectives nor to consider conflicting factors within the objectives in relation to the school's other objectives and the boundary conditions of the school's operations. Efforts can also

be justified using scientific results: the state of the environment must be taken into greater account in the future and, for example, action must be taken to halt the greenhouse effect. These objectives can be written into public statements and strategic texts related to school development, and they can extend all the way to school curricula. However, a closer analysis reveals many internally contradictory factors within the objective in relation to the structural tensions and the range of tasks in the school institution. In addition, overly vague objectives do not provide support for the real basic work of schools.

At the same time, it is necessary to be aware of the school's one key task. It is responsible for separating out pupils onto different education pathways by means of various diplomas, certifications and grades. The links between these certifications and economic growth, competitiveness and working life give risk to highly conflicting requirements from the perspective of sustainable development, along with different rhetoric in the discourse surrounding education.

The rhetorical level of the school hierarchy is very open to various new ideas of this type regarding what schools should be doing and where society's problems lie. However, these texts or speeches are not presented very clearly or logically from the perspective of practical operations. As reform goals become more extensive and the intended impacts reach ever further, it becomes more challenging to use them to bring about the desired direction of change in schools. According to Labaree (2010), this upper rhetorical level is where most school development efforts become stuck. The visions and programmes never affect everyday life in classrooms or pupils' mindsets. At the same time, there are also several other reform efforts underway at the operational level of schools, which are often at odds with each other. They compete within the system for the attention of teachers, pupils and parents.

In order to actually realise the rhetorical objectives at the school level, they must be expressed as clear goals to which the subsequent levels of the system are committed. This is how real problem solving should function. To overcome the task, a model would be created to bring together all of the information needed to understand and control the phenomenon. For schools, this is not possible. In order to understand a wicked problem with sufficient accuracy, all of the imaginable solutions associated with it would need to be considered. Each of them would require additional information. As regards school education, the information

necessary to understand the solution depends on the idea that will be used to solve the problem.

In this example, the requirement that schools adapt to support sustainable development is an extremely broad and complex goal: what does it mean? How should it be implemented in schools? Which subjects are responsible for it and in what extent and depth? When can we say that the change has begun and when can we say that it has been implemented? Is it all about improving learning outcomes, changing attitudes or long-term consequences? Most likely, these would only be some of the requirements and factors for analysis. How should these be measured? Which of the results will be due to the activities of the school and what are the effects of the home and other variables? How can they be separated from school activities? The result is an endless number of new questions. Identifying the problem is the same thing as solving the problem. Formulating the wicked problem is the problem itself.

PERSISTENT VALUE TENSIONS IN SCHOOLS

In the model proposed by Labaree (2010), the second level of the hierarchy is the school's *institutional formal structure*. It is a historically developed, complex, bureaucratic, massive system. It consists of a school administration system (administrators, school districts), educational programmes and lesson allocations, legislation related to teaching, inspection and surveillance procedures, evaluation systems, teaching materials and workshops. The actors are representatives of the school administration, members of committees and management groups, educators, curriculum specialists and textbook publishers. At the rhetorical level, the opportunities to influence this formal structure are problematic in many ways. For example, in the United States alone, there are approximately 14,000 school districts, each with their own organisational form, local customs and values. Even in a small country such as Finland, the municipal school administration includes more than 300 units, and they have their own school districts. In addition, all Western countries have private schools, which generally have different principles and characteristics than those used in the public-sector school system.

Education objectives from the rhetorical level are proposed at the institutional level with the aid of curricula and various school

development programmes. The intention is to use these to attempt to steer this massive system in the desired direction. However, the curriculum is not a clear, neutral, logical document—it is an ideological, multi-levelled, fragmented and ambiguous collection of text about various educational tasks. John I. Goodland (1979), an American education researcher, posed an incisive question about the vagueness of the concept of a curriculum: who has the right to determine what course content is worthy to be described as a curriculum? Education historian Lawrence Cremin (1987) has pointedly asked whether all institutions have official curricula: the church, the family, even the TV channel? American curriculum expert Joseph Schwab (1978), in turn, noted in the 1970s that all curricular theories are imperfect. According to him, theory is only useful if it has practical applications.

Political power is reflected at the institutional level in other ways than via the school curriculum. Education is steered by a multitude of laws, while programmes, research and development work are sponsored by political entities. There are regulations governing teachers' qualifications and the effectiveness of education is evaluated. One of the most visible effects of politics, specifically on the development of the American school system, was "Sputnik shock", when the Soviet Union launched its own shuttles into space during the Cold War. The result was a strong emphasis on mathematical and scientific subjects because decision-makers felt the US was falling behind the Soviet Union in terms of technological development. In Finland, similarly powerful, rapid changes have been made to the focuses of curricula as a result of state-level crises. Russia's administrative machinery made a strong intervention with regard to lesson allocations when the policy of assimilation began in 1899. After the Civil War, Finnish folk schools became instruments of the national policy of assimilation. This nationalist ethos of the school reached the end of the road in the autumn of 1944. The collapse of the Soviet Union and the neoliberal policies of the 1990s were clearly reflected in the 1994 curriculum doctrine: freedom for schools and freedom of choice became evident at all levels. The most recent school curriculum, and the intensified evaluation practices in particular, demonstrate society's growing efficiency requirements and the increasing impact of the market economy (Salminen 2012).

The American curriculum researcher, John D. McNeill (1985), has summarised the ideologies underlying the curriculum under four main categories. *The humanistic premise* aims to guarantee individually satisfying experiences for everyone. The curriculum is a liberalising process that responds to the need for mental growth. It is opposed to the bureaucratic control of teaching and education, centralised planning models, precise objectives related to content, excessive emphasis on the practical and connecting the school, for example, to the spheres of influence of working life or economics. The school has therefore lost its humanistic values, mental, aesthetic and ethical aspects have been neglected. The most critical speakers claim that schools are actually damaging to low-income people and minorities.

Academic curricula partially aim to achieve the same results as in the humanistic tradition but the definition is more precise, pre-structured. Academic curricula stress that the curriculum should be seen as a tool that enables sciences, considered to be valuable and structured entities, to be offered to pupils. This then guarantees the best opportunities for further training. This aspect became stronger in the US after the 1950s. It is characterised by curricula and teaching materials developed by experts and it is based on the traditions of universities and strong faculties. A carefully structured curriculum affects the organisation of teaching in many ways. In the United States, it has been deemed necessary in light of the relatively low level of education among teachers. The German *Lehrplan* tradition has also highlighted this aspect. The Finnish grammar school system largely represented the principles of an academic curriculum. Its primary objective was to pave the way to university.

The *technological perspective* sees the curriculum as a production process and an extension of politics. It is used to fulfil certain requirements, and it cannot be neutral. The curriculum can make suggestions regarding teaching methods and organised experiences. The technological aspect has several levels. Narrowly speaking, it means arranging education using technical aids. It may mean computer-assisted learning, individual opportunities for study, using audiovisual tools. Various classifications of these can be carried out, but there is also a broader interpretation. This often refers to the efficiency of teaching programmes, methods and materials. Technology affects the curriculum in two ways: as applications and as theory. Applications are practices that make use of technological aids. On the theoretical level, it may be a certain means of defining and steering education and teaching. Narrowly speaking, in the latter case, the focus

is on how teaching can be made efficient. What are the best methods and how can they be put into practice?

The fourth category presented by McNeill is the curriculum *as a social construct and phenomenon*. In this case, we take an optimistic view that the curriculum can be used to make a difference in terms of equality and changing the social structure of society. The curriculum is undeniably linked to the (local) community surrounding the school. This perspective has received support from critical pedagogical bodies as the social interpretation of the curriculum takes better account of cultural needs and the interests of minorities.

All of these definitions of curricula have a different relationship with the objective of promoting sustainable development, and they cannot be forced together. As such, the curriculum is not a clear, systematic and logical structure but a diffuse, unbounded and open one (Jackson 1992). According to William A. Reid (1999), the concept of the curriculum is troublesome in contemporary language because it can mean very different things to different groups of people. It has lost its position as a common context for everybody. As regards steering schools, the situation is challenging: school curricula do not mean the same thing to everyone.

THE MANY DIMENSIONS OF THE EDUCATIONAL MISSION

Educational work in schools includes a variety of target areas, which official curricula and development programmes aim to orient towards desired effects. These are the intellectual, emotional, social, physical, aesthetic and transcendental (mental or even spiritual) dimensions of education (Foshay 2000).

The majority of the discourse on school education since schools have existed has concerned itself with intellectual questions. Curricula and teaching materials have been prepared and schoolwork has been evaluated primarily on intellectual bases. One of the constant basic tasks of schools has always been to foster an increase in knowledge and skills. With the rapid development of industrial society, knowledge and learning have become increasingly important starting points of human activity, a position that has only intensified in recent decades with the arrival of the information society mindset. Most criticism of schools has focused on the ineffective teaching that has taken place in the last 60 years, inadequate learning outcomes and an inability to address the new demands of society as regards the growth of knowledge. Concerns about learning

outcomes have been constant. Many school reforms, particularly those in the United States, have been initiated due to the poor learning outcomes achieved by schools. According to education researcher Reijo Miettinen (1990), talk of a crisis in schools has been a constant, established topic in Western countries since the 1950s, and researchers and politicians have involved themselves in this topic.

But to what extent is the goal of promoting sustainable development and wellbeing a purely intellectual one? Is it not more about values, attitudes and a permanent change in lifestyle, even a moral responsibility towards our planet? The objectives of promoting sustainable development cannot be reached simply by adding sustainable development courses to curricula, developing teaching materials or arranging recycling weeks at schools. A much deeper change is required in the culture of schools and education if real results are to be obtained. Merely increasing the amount of information will not in itself solve societal problems.

However, the emotional element referred to in the school debate has received much less visibility than the intellectual goal. Finnish educationalist Kari E. Turunen (1999) has aptly stated how purely rational planning leads to schools becoming “machines” that produce creatures with specific knowledge and skills. Increased youth depression and self-destructive lifestyles represent a challenge with regard to the duties of the education system. Despite the abundance of offerings and wealth of materials, Western education has not necessarily succeeded in making people happier. School shootings in the United States and in Finland have led to extensive public discourse on the lack of wellbeing among young people. In connection with these shootings, Finland’s international PISA reputation has been cast in a critical light. British journalist Roger Boyes was interviewed by Finnish newspaper *Helsingin Sanomat* in November 2007 and he posed the following question: “You have an amazing educational machinery, but are children measured solely on their study attainment rather than in terms of their human development?”

The social imperative is employed to create an atmosphere of peace and democracy in the classroom and thereby in society more broadly, and also to guarantee that children have safe and pleasant group experiences as part of their schoolwork, thereby reinforcing societal structures. Social problems in schools—breaches of peace in the work environment, school bullying, school violence—prevent pleasant and productive intellectual learning. As such, even minor disruptions in social interaction in

the classroom are immediately reflected in other reference areas and, in the worst case, may even prevent intellectual learning from taking place altogether. As regards the teacher's work, these problems are the greatest burden and hamper the achievement of educational goals.

Education in the physical capacity has occasionally been the subject of school-related debate. Often, it is limited to the area of physical education. However, physical capacity comprehensively controls the pupil's experience and may give rise to problems for the school. Schools have only a limited ability to ensure that children are able to enjoy the right kind of nourishment and get a good night's sleep, but children's problems in satisfying these basic needs become the immediate problem of the school. It would be a serious mistake to ignore basic human biological needs in school operations. For example, the amount of sleep that children get during developmental phases may be a crucial factor in enabling balanced growth, wellbeing and learning outcomes. Too little sleep is inevitably reflected in young people's school activities.

Studies have shown continuous fatigue to have both somatic and psychological effects on young people. Higher cognitive functions, such as abstract thought, are weakened, irritability and impatience increase, and emotional control deteriorates. School performance has also been shown to decrease with fatigue. Tired young people are also more prone to traffic-related accidents. Studies by the Finnish National Institute for Health and Welfare since the beginning of the 1980s have shown that the amount of sleep that young Finns get every night has been decreasing for three decades. In parallel with this, the number of people reporting a feeling of fatigue has increased. Based on these studies, it is easy to draw a conclusion: many of the problems related to the wellbeing of pupils are essentially physiological deficits, and attempts are made to address this problem using pedagogical techniques, new teaching materials and working methods. A hypothesis may be proposed that one of the key reasons behind the continuous increase in the number of pupils with special needs is the permanent lack of sleep caused by the hectic nature of society, with attempts made to address this problem in schools using an ever-expanding range of technologies and arrangements for special education. This solution is expensive and inefficient, and does not address the problem itself.

The physical imperative in the school context has also been given a completely new dimension by the culture of youth and experience, which has been intensifying since the 1970s. It has advanced through the media

industry and at the behest of the media industry into classrooms without any consultation with teachers, accompanied by its own range of opportunities and problems. According to education sociologist Tarja Tolonen (1999), school children settle into school specifically as embodied actors. Girls and boys are engaged in a struggle for public space in educational institutions. The school is beginning to resemble a stage on which a type of social Darwinism is acted out. Appearance and clothing are scrutinised—gazing at others has become the most active thing to do.

Likewise, the aesthetic dimension of school education has been present to a minor extent in Western educational discourse. In the main, it has been the subject of occasional references by school architects and representatives of arts education and Steiner pedagogy. However, Foshay expands the topic to more than just art education. The school building, with its forms, colours and use of space, the study materials that are used, the texts that are read at school, the things that teachers say also produce features of the aesthetic experience. Awakening a sense of beauty is a classical tradition in education, and it can easily be overlooked when the aforementioned dimensions occupy time and space in discourse. The use of premises and the influence of architects has a significant impact on people's wellbeing in the workplace. Developing an aesthetic dimension to promote wellbeing comes up against resource problems.

The transcendental educational imperative is the least visible sub-area of the matrix in earlier curriculum theory. According to Foshay, it has even been directly neglected in school education. However, it is difficult to define precisely. Foshay has sought a historical basis for the imperative mainly within the scope of theology. The spiritual experience incorporates the same elements. In the context of learning, talk sometimes turns to key moments or "Eureka!" experiences. These refer to highly significant learning situations that may have a decisive effect on subsequent stages in the person's life. For many pupils, an individual positive and successful event at school may lead to a choice of profession, provide the basis for a career in research or lead to a lifelong hobby.

A continuous struggle is taking place in society between these six educational objectives: on the one hand, the debate centres around the importance of school education; on the other hand, the focus is on the roles of different subjects in relation to the objectives. Experts from various fields and representatives of educational disciplines take a stand on the meanings of the imperatives with different emphases and demands.

Societal conflicts can even be exploited as a means of justifying the importance of a particular subject and imperative in school programmes. One example that may be mentioned of this is the rhetoric entered into by representatives of art and craft subjects to safeguard the positions of these subjects within the school—they talk of their subjects as means of mitigating social problems and increasing the wellbeing of young people. In this context, there is absolutely no intention to contest the findings made by educators of sports and art of the ability of sports or arts education to enable emotional unloading, the potentially empowering effect of such unloading or the importance of music education as a socially constructive activity. However, it should not be forgotten that there are many other subjects that can produce very similar experiences among young people. Demands to increase the amount of teaching of art subjects in schools with the motive of preventing school shootings are based on an absurd causal inference and can be considered an exploitation of a societal crisis to advance personal objectives. Using equivalent logic, almost any societal episode could be explained in the desired manner and the arguments could be used to promote a certain type of activity in schools (Salminen 2012).

The substance of subjects as a feature of educational goals and as a factor in the selection of the content that is taught is the target of ongoing ideological debate. What should be taught to young people? What should be set aside and which new responsibilities should the school assume? In Finland, the struggle over content is particularly intense when discussing different subjects and the number of hours spent on each subject. In the modern school system, the number of hours dedicated to each subject is a representation of the purpose of the school. All of the subjects and learning entities taught in school have their own development histories and current societal connections. Various interest groups seek to defend the position of a certain subject or content in the curriculum.

The amount of information produced by universities and the skills valued by society are channelled and administered to young people via school timetables. For this reason, numerous societal interest groups and stakeholders involve themselves in this distribution of scientific knowledge for external use and take their own positions on such distribution. In a sense, the struggle is ultimately over control of the worldview and future of pupils. The aim of promoting wellbeing is a typical broad and

multi-dimensional educational issue, which should be defined more precisely: what does it mean for the work of schools? Which subjects are responsible for the promotion of its objectives? How is it realised in practice? To what extent is it debated and how can the results be assessed?

In addition to these official objectives, school culture consists of more than just educational objectives and contents. Questions about rights and obligations, rewards and punishments handed out by the school, the rules that are used, the limits of responsibility and freedom are everyday educational matters, regardless of the subject. Often, there is no single clear and correct solution, meaning that decisions must be made very quickly. Throughout the day, the teacher will be called upon to resolve numerous moral questions, whether large or small. As regards day-to-day work in schools, these numerous, diverse and ever-changing priorities and new requirements have led to a challenging problem of balance. When school conditions are considered to encompass the realisation of a “hidden curriculum”—instilling values, beliefs and practices that are not stated as official educational goals—the educational function becomes even more complex to carry out and to analyse. At the same time, it should be noted that the demarcation between the official and hidden curricula is not always clear (Broady 1994).

Education sociologist Risto Rinne (1987) has published an article describing the permanently ambiguous and interpretive nature of curricula, which are accompanied by continuous compromises, as a type of societal buffer. It is as if curricula were not intended to be realised as such. The apparent harmony that appears in them can be a means of satisfying societal demands for change that have emerged and are triggered by putting pen to paper. At the same time, societal pressures for change are tempered. The educational administration is also granted a form of absolution. It has done its work and can attend parliamentary debates or make media statements to the general public about how a topical phenomenon in environmental education has been taken into consideration in schools (better than before) by means such as increasing the content of environmental education. The same people are highly unlikely to be called upon to justify the actual impact of this change in the curriculum several years or decades after the fact. The entire school administration and the parties that benefit from schools all assume their own roles in this apparent curriculum change and “poetry”.

PRECONDITIONS IMPOSED BY PRACTICALITY

The third level of the hierarchy in Labaree's (2010) classification is constituted by actual teaching, *practical educational activities* that take place in schools and as part of the operations organised by schools. It is only at the third level that real impact can begin. Realising the school's educational objectives is always dependent on the degree of commitment of teachers. It is their responsibility to promote the objectives that are set. They are the key group in promoting the objectives of sustainable development.

At the same time, the teacher's educational task is extremely complex and contradictory. During one lesson and one school day, the teacher could theoretically run into thousands of small variables between which education must take place and values and priorities must constantly be selected. Although the work in traditional school classrooms is formulated into a reasonably well-defined activity by means of the prevailing pedagogy, the curriculum and the physical classroom space—in order for it to be at all possible and to some extent manageable and predictable—an almost infinite number of factors are always present in educational work. The majority of these support school activities, but many are also in a permanent state of conflict with each other. However, there is often no direct recognition of the complex and tense nature of the teacher's circumstances when new large-scale educational tasks and work development requirements are set for the school.

Every teacher who has done practical teaching work for any length of time will have come across these conditions of their work and quickly discovered the multitude of constraints imposed by them: pupils' interests and abilities vary, as do learning conditions. Education should be individual, but it takes place in a group. Questions about what, why and how lead to complex ideological, psychological and pedagogical tangles. Educational scientist William A. Reid (1999) has defined seven different classifications of variables affecting the implementation of the curriculum when teaching is arranged (how). These are the concepts of knowledge and knowing, truth-values in different subjects, child development, the nature and characteristics of the teacher, the interaction between pupils and teachers, the role of teachers and effective teaching, as well as the curriculum itself.

Many material factors complicate teaching work. There is generally too little teaching time in relation to the objectives. Classrooms

are cramped, making individualisation more difficult. In large units, it is necessary for schoolwork to be fragmented for logistical reasons by means of timetable and space arrangements. Teaching tools and materials are rarely sufficient, equipment does not function reliably, support staff are rarely available. The assessment methods determine the content in advance. This in turn makes it difficult to teach “meta-skills”, which cannot be measured by end-of-term tests. The list of factors such as these that restrict teaching work and limit optimal learning by children is almost endless. In addition, the opportunities open to educators and young people to modify these conditions are usually rather limited. The framework is largely determined in advance. Even individual schools rarely have the possibility to make an appreciable difference. It is hardly ever possible to push through practice under ideal conditions. Naturally there are differences between educational institutions, school districts and municipalities. Some schools are worse off than others.

The work of teachers is constantly based on highly uncertain knowledge in ever-changing conditions, unlike the work of professionals in other fields such as medicine or law. In the latter fields, each ongoing work process can often be narrowed down and isolated quite unambiguously, quantitatively, qualitatively and technically. In the work of school teachers, this is rarely possible. Schoolwork is carried out in group form: numerous individual and societal processes, communicative states and problem-solving efforts are underway on different levels simultaneously. By nature, these are all societal, psychological, ethical, moral, didactical and technical. In addition, spontaneous, accidental and irrational situations caused by external variables often arise in educational situations and the teacher—as the person responsible for the situation—must find a way to manage and resolve these.

Foshay (2000) has posited a theoretical number to illustrate the complexity of the reality produced by different variables. According to him, 145,800 interactions can be counted between content, objectives and practical questions. Of course, some of these are likely to be meaningless in practice, but the vast majority correspond realistically to work in a school. If all of these contents, means and practical processes are identified for every individual person in a classroom of thirty pupils, the job would involve managing millions of variables. Foshay’s proposed calculation of the interactions between the variables in the matrix is naturally pure illusion. Nonetheless, it is a tangible illustration of the incredible complexity of work in schools (value work), the difficulty in managing

the work and the sensitivity to disruption of numerous situations. At the same time, it indicates the deeply problematic gap between theory and practice. Scientifically, it is difficult to even estimate which factors in the classroom are relevant at any given time, or to decide which of them should be prioritised and how such prioritisation should be carried out.

Work to reform schools and teaching is also not subject to clear stopping rules. There are no criteria that would enable us to know when the problem resolution process is complete and the problem has been solved. The search for the solution to a wicked problem can be brought to an end by factors other than the discovery of a complete analysis framework. These include time, financial resources and people's ability to cope. Often, patience runs out and "a sufficiently good solution" is settled upon. These are often hasty compromises or political preferences. For this reason, attempts to bring about change in schools very often merge gradually into the prevailing system. According to a frequently referenced viewpoint, teachers change development projects to a greater extent than the projects alter teachers' activities.

At worst, the change has been confined to curriculum texts, even though it has been the subject of scientific reporting in terms of development outcomes. In many cases, practical work to carry out development projects in schools has discontinued before the project's final report has been printed for public distribution. Development cycles in modern schools have accelerated. The next reform begins before the previous one has been completed and evaluated. At worst, the next reform buries the achievements of the previous reform and cancels out the development work that was done. Real results should be measured several years after operations are initiated. However, this interval is generally too long from an administrative perspective.

As regards research and steering, development work in schools also comes up against serious questions of reliability. Development projects are often evaluated by the same body that then carries out the reform, whether these are school officials or interventions by researchers. The results are evaluated in terms of what was intended to be implemented in the project and not in terms of any other changes or even opposing changes that affected the school as a result of the project. In some cases, additional financing may depend on positive results. Intervention projects that are very narrow in scope are unlikely to even be aware of or follow up on the school's activities in a wider sense. School development very rarely, if ever, satisfies the prerequisites for reliability as required for basic scientific research.

The majority of teachers do adopt new tasks and methods, providing that they really help them in often difficult and complex circumstances. From their perspective, “improvement; new technology or method offered” has not always brought the help that was promised. On the contrary, development work very often begins by generating additional work and new problems that must be solved by the school community. This complicates the identification of clearly positive results. At the same time, the objectives of development work remain vague. As a frequently recurring cycle, this type of “development work” may erode the credibility of the key players when they promote new objectives and practices.

For educators, there is a constant danger of such disappointment. Poorly managed, vague curriculum reforms may lead to very negative results in school activities. They can put a stop to educational innovation and may even undermine teachers’ commitment. In recent decades, curriculum reforms have been initiated before the previous reform has been properly completed and evaluated. From the perspective of the history of education, it can be justifiably stated that implementing school education in this manner may reduce the commitment of key stakeholders and can lead to precisely the opposite result than that targeted by the reforms: resistance to change, frustration and development fatigue. Achieving permanent results requires long-term work and commitment to the objectives. It is ultimately a question of the adequacy and allocation of mental capacity. High teacher turnover, a desire to leave the sector and a reduction in job satisfaction are severe symptoms of school culture problems that cannot be explained away solely by economic factors.

PUPILS’ LEARNING

The final level in Labaree’s (2010) hierarchy—and the most important one in terms of the actual outcome of educational objectives—is *pupils’ learning*. Even if school reform on the rhetorical level receives widespread support throughout the formal and complex institutional structure and teachers are also committed, it is necessary for pupils to be motivated and able to embrace the goals that are set. After all, school effectiveness is simply a question of what type of knowledge, skills, metacognitive thinking and other educational goals have been permanently assimilated by pupils. In this case, the objectives of sustainable development would begin to appear in society decades later in the form of measures intended to achieve the desired objective.

With regard to pupils' learning, the situation has become even more challenging in recent decades. While school functions have expanded, traditional school education has been subjected to criticism in many forms. Teacher's authority has also weakened. According to Mika Ojakangas (1997), a philosopher, a trend began at the end of the nineteenth century whereby the freedom born of discipline and morality was gradually abandoned and a shift began towards the death of authority and—in one sense—the end of education. In the Western ideology of developmental thinking and liberalism, the destruction of authority was a condition of democracy. A belief also took hold within education that children can get by without authority, which could be replaced by persuasion, experts and technology. American researcher Maureen Stout (2000) has stated in her book, *Feel-Good Curriculum* that the United States has developed in exactly the same direction. How boosting self-esteem has become one of the most important goals of the school. At the same time, the traditional functions of a public-sector school—civic education, democracy, provision of information and skills—have become weaker in parts. The objective of enabling the creation of a school community has been marginalised due to emotional issues.

Education should be flexible, motivating, happy and playful; it should be driven by the child and the situation. For some commentators, school satisfaction will increase as learning becomes more fun and schools select a pleasant atmosphere of freedom. The correlation between a pedagogy of play and good learning outcomes appears to be obvious up to a certain limit, but this growing demand for freedom and openness represents a substantial challenge for schools. In basic, everyday work, it is difficult to make some content ever more motivating and the school is thus forced into the difficult position of a service provider. The English term, “*edutainment*”, describes this phenomenon, in which learning is made into industrial entertainment. When parallel entertainment production processes are underway in other areas of society, such as communication and politics, the end result may be—in the extreme case—the end of education. All prohibitions and restrictions are considered undesirable, all educational norms can eventually be relativised as being somehow restrictive of children's efforts.

German child psychiatrist Michael Winterhoff (2008) has suggested that children today are increasingly irresponsible and narcissistic. A type of symbiotic parenthood has taken the place of traditional parental authority. Children are allowed to act according to their desires.

In the event of a conflict, somebody else is always to blame: another child, the teacher, the teaching method, anyone else but the parent's own child. Similar remarks have been made by Danish psychologist Bent Hougaard (2005). He has publicised the concept of curling parenting. Hougaard uses this term to refer to the principle of education in which every obstacle and problem has been cleared from the child's path. The result is selfish people who cannot withstand setbacks.

The findings of youth researchers indicate that school curricula and everyday youth leisure activities are living separate lives from each other. The gap between young people's experience of school, with its strict timetables, and the other spheres of their lives seems to be the real problem of late-modern youth. Researchers in the sector propose a new form of communication to solve this problem: interactive situations would become learning situations in themselves. This gap between the traditional school and the world of experiences in youth culture cannot, however, be bridged by special arrangements, technology, didactics or fine-tuning of teaching. The principles of working from a starting point based on pupils' experiences and living environments and emphasising the situational nature of teaching cannot be summarised to create unambiguous operating instructions; teachers must trust themselves and their own life experiences as representatives of the adult generation. Researchers should overhaul the obstacles to their own thinking and routines.

Juha Suoranta, a Finnish researcher representing the critical pedagogical perspective, goes even further. In one of his articles, he proposes including hip-hop culture in school education. According to Suoranta (2005), hip-hop culture represents self-motivation and autonomy, self-determination, cultural dialogue among friends, societal criticism and commercialism. It would challenge the state-guided school's functions of teacher-led monologue and maintenance. Suoranta defines hip-hop as "popular politics". It could serve as a means for political education and could restore interest among young people towards societal issues—many studies have shown that young people shy away from wielding social influence.

LEARNING FROM MISTAKES

Naturally, studies based on school history cannot determine how the objectives of promoting sustainable development and wellbeing should be arranged in schools in the future. The issue revolves around

fundamental values, which no discipline is able to resolve. David Hume's classic guillotine slices through the neck of this prophecy: it is not possible to make statements about how things ought to be on the basis of how they are now. However, some cautious advice can be provided by research to support the effort.

Firstly, it should be noted that no clear means or scientific methods have been identified to facilitate rapid developments in the complex public-sector school system throughout its 150-year history. According to Cuban (1992), the system is a contradictory entity in which historically inherited, political, ideological, cultural factors related to resources, legislation and pedagogical techniques—partly in opposition to each other—are in constant interaction with each other preventing, rejecting, hampering and hiding change. Sarason (1990) and Labaree (2010) warn against excessively ambitious projects in schools. They will not succeed.

The proposal of the school system as a pioneer of societal activity is impossible to realise in practice. It would require the power relations in the system to be dismantled, a complete change to take place and the ability to determine who has access to the predictive ability that could enable current educational traditions to be dispensed with. School can never start with a clean slate. In addition, it must be remembered that the main structures in the system are long-term reflections of the social conditions in each period. The classical rectangular classroom shape was inherited from times that emphasised control over pupils (the fear of God). The compulsory nature of school, the obligation to study and the precise distribution of lessons have arisen to create central state control and regulation (control over school curricula). The didactics of masses, the pedagogy of the times, textbooks and workbooks, standardised tests, final assessments and many classroom practices are, in turn, technologies that have been shaped by the standards of industrial society. Current psychodidactical management techniques are based on scientific paradigms. All of these layers are stacked up in the school's complex operational culture. Changing them would require radical measures. The curriculum and pedagogy are not able to do this, although this is often expected—or even demanded—of them. Resolving environmental problems, improving public health, increasing world peace are societal objectives. They must be addressed through policy. Schools can only support these efforts to a minor extent (Salminen 2012).

On the basis of research into the history of education, the opportunities for educational institutions to keep up with accelerating change

are, in many respects, limited or non-existent. Due to their contradictory structures, schools are condemned to play catch-up. Whether this gap has deepened along with external reality beyond the school is largely a matter of interpretation and perspective. When researchers demand “the development of the entire operating model of the school” in speeches directed at the general public, it is worth asking whether they have any knowledge of the system they are talking about.

Research into school history has identified a number of variables that influence the realisation of new educational goals at school level (Tyack and Cuban 1995; Cuban 2003; Labaree 2010; Salminen 2012). First of all, the timing of pedagogical reform activities in relation to changes in society’s means of livelihood, technological development and the needs of working life play a very important role. This is an eternal horizon problem in school pedagogy. How far from the past or from other cultures and countries should ideas be drawn? How far into the future can the justifications be relied upon? When should school reform be delayed to allow circumstances to stabilise? Reform projects may be forced into marginal positions by rapid changes in surrounding conditions in a short period of time.

Secondly, reform also requires its own internal continuity and “freedom to work”. Otherwise, there is a danger that the activities will be suffocated by other variables. In terms of actual reform, new external variables often impose new boundary conditions on development work. This can be frustrating and tiring for key players. They will switch to other sectors. This risk is always present in the development of school curricula. When key players suffer fatigue, development activities often fade rapidly.

Thirdly, strong development of the curriculum requires financial resources. Economic forecasting is difficult, as the entire twentieth century has demonstrated. Even in peacetime, economic downturns have significantly affected school development work. This was experienced when Finland’s compulsory school system was being introduced in the 1970s and the oil crisis hit. Several reform activities and pledges had to be cut. The recession in the 1990s hampered and paralysed pedagogical development in Finnish schools for a long period. In the 2010s, school reform is once again being overshadowed by a steep economic downturn. The consequences for education have been varied and fluctuating priorities with regard to financing, objectives and development.

It is completely unrealistic to think that the development of school-work could be realised in the form of a voluntary vocation over long periods of time, driven purely by developmental interest or in accordance with operational research. Of course, the history of pedagogy features some of these altruistic people and surely they must exist at all times in some measure. Building the entire system and development work around such personal enthusiasm is, however, a naive idea. The casting of a low-paid, strictly managed and monitored civil servant by research literature in the educational field as a dynamic, creative, socially innovative agent of change—in the age of the harsh global market economy with intensifying performance targets—is a romantic, implausible, if not absurd, premise.

Fourthly, reform activities require the emergence of a favourable atmosphere to support development activities. Even if such a condition existed at the beginning of the development work, there is no guarantee that the same atmosphere will prevail a few years later. This can even apply to the wider cultural climate of pedagogy following a societal crisis. For educators, there is a constant danger of such disappointment. Poorly managed, vague curriculum reforms may lead to very negative results in school activities. They can put a stop to educational innovation and may even undermine teachers' commitment. In recent years, curriculum reforms have been initiated before the previous reform has been properly completed and evaluated. Achieving permanent results requires long-term work and commitment to the objectives. It is ultimately a question of the adequacy and allocation of mental capacity. High teacher turnover, a desire to leave the sector and a reduction in job satisfaction are severe symptoms of school culture problems that cannot be explained away solely by factors related to remuneration.

Fifthly, school reform requires strong support at the school administration level. Changes in the administration have an immediate impact on the operational culture of schools but schools have minimal opportunities to influence the way in which administration is organised. When political trends change, schools' priorities often change too. Such sudden decisions may cause counter-reactions among teachers to resist development, as they relate most directly to those who in reality have initiated some activity. Many projects that have been initiated begin to waste away in such a situation, with the consequence that the next curriculum reform is more likely to be given a more cautious reception. Poorly managed reforms consume the credibility of subsequent reforms. At the same time, at the level of individual schools, cynical teachers who are stuck in

traditional ways receive ammunition to use against development within the working community, bringing the weight of experience to bear in order to show that the work is unnecessary over a time horizon of a few years.

Sixthly, individual educational institutions are always dependent on their pupils and the support of their parents. This is another of the eternal problems surrounding school development work. New innovations must enjoy the support of stakeholders in order to enable a break with tradition and to arouse interest in schools. Otherwise, the force of tradition will take hold or suck the reform in very quickly. If, however, the reform effort is too strong, it can easily end up becoming detached and being seen in a strange light throughout the system. Nobody can predetermine the correct intensity of intervention. According to Labaree (2010), consumers will eventually decide what kind of education they desire for their child. Their assessment has a greater impact than the new rhetorical efforts of school reformers.

Seventhly, teachers must be fully committed to long-term reform and must solve the new difficulties that it causes. This is a typical problem in the field of education. It is always easy to be impressed by new things for a certain period of time. Interest in the school's activities among external parties and positive publicity in the media are likely to motivate the key players during the early stages and also encourage additional efforts. Within a few years, however, media interest—perhaps due to the very nature of media—will fade, leaving everyday schoolwork to continue as normal. If, at the same time, additional financial resources gradually fade, development work will lose its appeal.

The most important factor for the development of school teaching comes from the top level of the hierarchy of educational institutions: universities. The most decisive aspect is the attitude taken by institutes of higher education to new priorities. English School historian Ivor S. Goodson (2001) has presented a theoretical model of the way in which structural changes to the educational syllabus often occur. According to him, the attitude taken by institutes of higher education is highly significant in terms of the success and permanence of the change. Subjects for which university faculties provide traditional support—a subject department and professorships—hold the strongest position in schools. These faculties monitor and regulate teaching activities in educational institutes lower down the chain by defining the core contents. For this reason, it is difficult for new subjects and objectives to gain a foothold in

school programmes because the scientific background support is weak or non-existent. One key conclusion to be drawn from this is that the objectives of sustainable development should be given greater priority in universities and should cover the cultures of various faculties. From there, these aims would eventually make their way down to schools.

The public-sector educational institution, which was built around the standards of the Christian curriculum, Prussian regulation (state-centric nature) and the industrial society and constructed for over a hundred years, is undeniably facing a growing challenge. According to William A. Reid (1999), traditional curriculum-based thinking is struggling to identify genuine opportunities to influence the activities of schools. The traditional basis of the curriculum is beginning to deteriorate or at least to weaken, without the system currently having a new, sustainable foundation, scientific paradigm or other basis that could reliably support it. The promise of the opportunities of open learning environments, the individualisation of teaching and non-formal learning winning out have, in many respects, remained unfulfilled, and some are in serious conflict with other educational targets set for schools.

Since the 1990s, societal policies that emphasise individual choices have grown in importance and begun to affect educational structures everywhere. At the same time, the rhetoric around education has begun to include terms such as profit centre, customer relationship and quality. The change may reflect a deeper shift in which it may no longer be a case of comprehensively analysing education and developing society. Instead, it may represent a movement towards an expert-orientated, technocratic system of governance, with various specific indicators and technologies employed in an attempt to exert control (Salminen 2012).

In such a situation, efforts to promote the goals of sustainable development and wellbeing at school level can only be approached with very cautious aspirations. Schools can play a small part, but they cannot do any more than that on their own. Unrealistic visions do not benefit anybody.

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CHAPTER 4

Schools as Equitable Communities of Inquiry

Robert Riordan and Stacey Caillier

INTRODUCTION

In a working paper on sustainable well-being, the Sitra Foundation (2015) emphasizes schools as centers of transformative action to address the twin challenges of diversity and complexity in the emerging world:

The future school has to answer the needs of an increasingly complex and global world and raise youth to collaborate and work in networks with people from different backgrounds. Instead of studying theory alone, learning happens by experiencing together. The problem to be solved is outlined together and knowledge is gathered and assumptions tested in concrete experiments outside the school building. (p. 17)

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What would such a school look like, in the face of an uncertain future? In its attention to diversity and action, it would ignore the basic axioms of twentieth-century schooling, i.e., separate students into “tracks,” divide knowledge into “subjects,” and hold school separate from the world. Instead, the school would integrate students, engage in transdisciplinary study, and connect with the community. It would foster self-directed learning, individual and collective agency, and the passionate pursuit of important questions.

If this is the project, what issues of purpose and practice arise? How can schools achieve the agility, not only to adapt to a changing environment, but also to engage in transformative action? What roles must the teacher assume in such a setting, and what kinds of training and development will be necessary?

In this chapter, we argue that life in schools, like life in a well-being society, should be coherent—that is, comprehensible, manageable, and purposeful (Hämäläinen 2014). The diversity of our students, the complexity of the world, and the urgency of our current condition demand a paradigm shift where schools, rather than purveyors of inert knowledge, serve as centers of community inquiry and action. We take inspiration from the philosophy and methodology of John Dewey (1938), in his emphasis on the connection between experience and education, and Paulo Freire (1998), in his insistence on the educator’s responsibility to help students understand their own reality and take transformative action in the world, as well as the work of Timo Hämäläinen (2014) and colleagues on sustainable well-being. The sense of urgency comes, as well, from our growing awareness of the mental and physical toll of a stressful school environment, which has reached the level of a child/adolescent mental health crisis in the USA (Abeles 2015).

We define equity in schools as a condition where everyone exercises voice and choice, engages in work that is accessible and challenging, and connects with the world beyond school—in short, where all have access to deeper learning experiences that prepare them to lead a purposeful life once they graduate. We link equity to sustainability because the world in every corner is becoming more diverse, a phenomenon that problematizes the issue of equity as a subject for inquiry, action and reflection. In a world where schools lack a common narrative to inspire and engage (Postman 1995), we see equity and sustainability as viable purposes of schooling, not simply subjects for study. We espouse a general principle of integration, and we imagine schools as reflective communities of

inquiry that grapple with questions of equitable teaching and learning in a diverse setting.

Drawing on our work at High Tech High in San Diego, we propose principles and processes for schools as equitable communities of inquiry. Indeed, the future school we envision is not an achieved state, nor will it ever be, in a rapidly changing world. Rather, it is a reflective, self-renewing, cross-generational community, well situated to conduct inquiry and take action on questions of purpose and practice: who are we, what kind of community do we envision, and how do we move forward together?

THE PURSUIT OF QUESTIONS

What questions, concerns or wonders do you have about the world? About your life?

These questions await the 54 students in Bobby Shaddox and Allie Wong's combined 6th grade class as they rush in from break. The students, broadly diverse by race, ethnicity, socio-economic circumstances, and prior academic achievement, look at the whiteboard and then at each other with excitement and a little puzzlement. Bobby and Allie quickly get them oriented to the task at hand, and they begin filling up post-it notes with their questions. For 25 minutes students dream, ponder, and wonder. Then they begin sharing their questions.

How can we turn salt water into drinkable water?
 How could we make a car that would run on trash?
 How can we stop global warming?
 Why am I angry?
 Why do people hurt each other?

As they share in small groups and post their questions on the walls, the students begin to identify themes. Many of these have to do with the beginning of life, the end of the world, and the role that humans play in both. As a class, after days of discussion, they craft an essential question for their collective project: What are the ways in which the world might end, and what can humans do to prevent it?

Over the next three months, students work in partnerships to explore questions within this broader theme. The questions connect, in one way

or another, to science, math, and humanities, the cluster of subjects for which Bobby and Allie are responsible. However, they are not simply entry points for subjects—they are life questions. Some students study black holes; others investigate the Mayan calendar, tsunamis, hurricanes, epidemics, volcanos, war, deforestation, climate change, tectonic plates, or meteor impacts. Students reach out to living resources, visiting online or in person with experts in India, in Hawaii, at local universities and museums, and elsewhere in the community. Throughout the project, the students employ consensus processes and committees to make decisions about everything from the final product to the audience to the timeline. In the end, they organize a public exhibition to introduce their book, *The End of the World Uncovered* (2012), filled with original art and writing, the product of many rounds of peer critique and revision (see Fig. 4.1).

Exhibition plays a special role at Bobby and Allie's school, High Tech Middle, as the prospect of an authentic audience has an enormous impact on the quality of student work. Moreover, exhibitions serve as a powerful community organizing tool, as students insist that their families and friends turn out to see what they've done. On the night of the annual all-school exhibition, when each student presents work, it is nearly impossible to find a parking place for blocks around, and hard to move inside the building, it is so crowded.¹

Bobby and Allie are not alone in this work. In a kindergarten class at High Tech Elementary in Chula Vista, teachers pose a similar question to students: What are your questions about yourself and the world? Many of them are wondering about caterpillars, since there is an infestation of caterpillars in the trees and shrubs around the school. They develop an exhibition called "Caterpillar Café – Everything You Ever Wanted to Know about Caterpillars." Seniors at HTH International, in response to the same question, mount a research project and compose a volume of articles on how adults view—and often misperceive—adolescents. At High Tech High, 11th grade students have engaged in an ongoing study of San Diego Bay under the direction of biology teacher Jay Vavra and humanities teacher Tom Fehrenbacher. Each successive year, juniors publish a book on some aspect of the Bay—the fauna, history of the Bay, the impact of human activity, the potential of biomimicry for remediation (Fehrenbacher 2015). Other classes may interview military veterans, write a book on economics, produce a documentary on gun violence, design assistive devices for clients of a local health agency, or develop a DNA

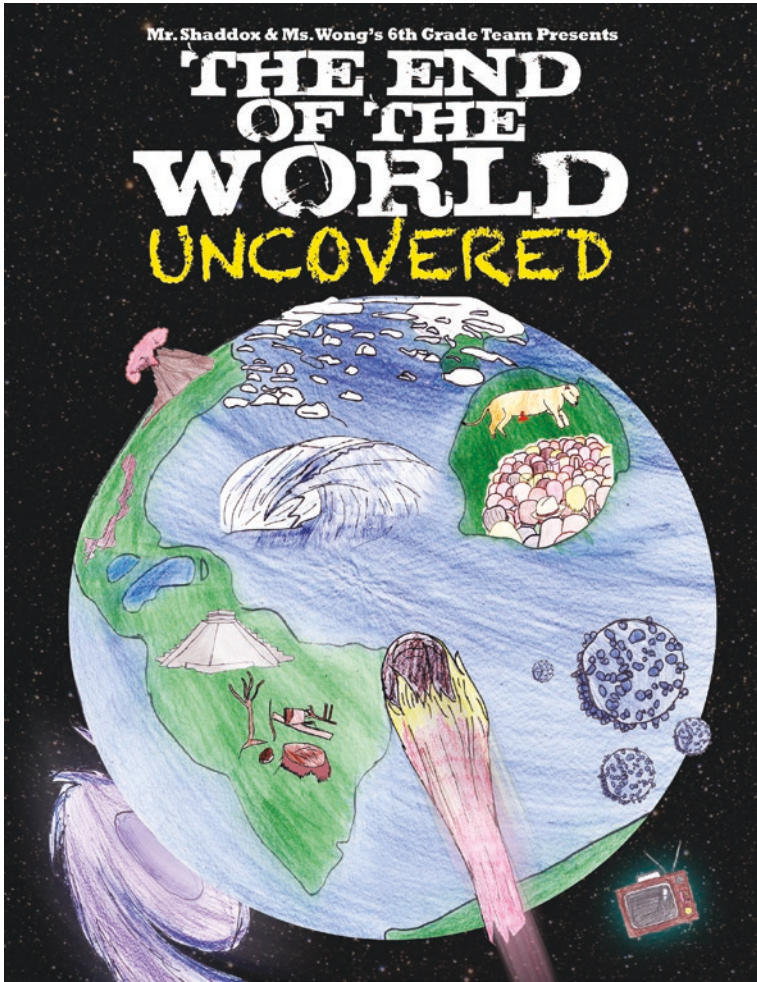


Fig. 4.1 Cover, *The End of the World Uncovered*

barcoding device for species identification from meat samples. Across the 13 High Tech High schools—4 elementary, 4 middle, and 5 high—this is the aspiration: to pursue important questions and share findings, with the goal of fostering individual agency in a community of learners.

As their students uncover the end of the world, Bobby and Allie are pursuing a question of their own: What happens when we co-design projects with students? (Shaddox 2013). Indeed, they work in an organization where the pursuit of such questions is taken seriously and supported as part of teachers' work, both at their school and in an embedded High Tech High Graduate School of Education (GSE), devoted to building leadership capacity within the organization and beyond. Through the graduate school, and through GSE-supported "improvement groups" in the K-12 schools, teachers have studied a wide range of questions regarding purpose and practice,² e.g.:

How can we make group work more equitable?

How can we ensure that all students have a meaningful internship experience?

How can we use peer critique to improve the quality of student writing and develop a culture of collaboration in our classrooms?

What prevents "chronically absent" students from coming to school, and what can be done?

How can we increase students' sense of agency and authority in math, so they learn to trust their own thinking and value the thinking of their peers?

How can we cultivate a sense of belonging and strengthen peer networks among boys of color so they experience academic success in our schools and beyond?

What does it mean for schools to serve as equitable communities of inquiry? To begin with, it means that we honor questions more than answers. And if, as in Bobby and Allie's classroom, we start with diverse students posing questions about themselves and the world, we bump smack up against the culture of conventional schooling: management structures, grouping practices, curriculum, pedagogy, assessment, teacher development, and relationships with the larger community. Transforming schools into centers of equity and sustainability requires a paradigm shift, along with the commitment, dispositions, and processes to drive continual improvement as educators and students engage together in work that matters.

STRUCTURES THAT LIBERATE

You can tell everything you need to know about a school's priorities by the way it allocates adult and student time and resources.

—TheodoreSizer, American educator

Anybody can make the simple complicated. Creativity lies in making the complicated simple.

—Charles Mingus, American jazz bassist and composer

Current structures (by which we mean the way schools allocate adult and student time and resources) complicate life in schools, especially in middle and high schools. The great irony is that conventional school management structures, put into place a century ago with the aim of industrial-style efficiency, end up being horribly inefficient for effective teaching and learning. A typical middle- or high-school student goes to six or seven different “stations” per day and receives several different “homework” assignments, for which she is accountable to several different teachers. And the teachers? A typical high school teacher sees as many as 180 students per day, teaches in isolation, and rarely engages in professional activity with colleagues except in perfunctory monthly department meetings or one-size-fits-all “professional development.” There’s nothing coherent or purposeful about these structures, for teachers or students. For the most part, despite the best efforts of educators, schools are control centers of inequity and alienation, except for certain extra-curricular activities, such as after-school athletics or school plays, where the aim is not “coverage,” but, rather, public exhibition or performance.

The conventional structures are not only complicated, but also inequitable, by design. Donald Berwick, a founder of improvement research in health care, has noted that “every system is perfectly designed to achieve exactly the results it gets.”³ The starting point for education for equity is to understand that conventional schooling in the USA, as a system, is structured for inequitable access (Oakes 1985). The ubiquitous practice of separating students based on presumed ability, as reinforced by standardized tests that value a narrow band of intelligence, along with a curriculum based on narrowly construed and confining “subjects,” not to mention the housing patterns and districting practices that yield school populations more segregated than before *Brown v. Board of Education* (Orfield 2009), guarantees inequitable outcomes. Moreover,

these structures—the “existing regularities” of school culture (Sarason 1982)—are remarkably resilient and resistant to change.

In *The End of Education* (1995), Neil Postman observed that no “transcendent and honorable purpose” drives the activity in public schools and that, if schools do not find their end, as in purpose, they will meet their end as in demise (x–xi). In other words, education without purpose is unsustainable. Achieving high tests scores is not a compelling purpose, especially for students and schools that don’t score well, year after year. Indeed, schools are stuck with the cross-purposes of sorting and equity, responsible both to sort students according to their “readiness” and to ensure equitable outcomes. This is a false dichotomy, based in a narrow conception of readiness and resolvable by adopting equity and agency as the essential purposes of schooling.

What are the structural features of a sustainable, equitable learning environment? How might the school experience be more coherent and less alienating, for both students and teachers? What are the structures that liberate—that promote engagement and unleash energy?

We see such structures in Bobby and Allie’s classroom, and in the larger context in which they work. Students at their school, High Tech Middle, are selected by a blind, postal-code based lottery, so as to represent the demographics of the school-age population in the city.⁴ Once in the school, students are not tracked or streamed. Instead, they are assigned randomly to classes, with an eye toward assuring that each classroom mirrors the overall diversity of the school. They move through the day in stable cohorts, each served by a team of teachers who share the same students as they collaborate in transdisciplinary work. Teachers function as co-designers, responsible for the curriculum in their classroom. Teachers may say, “We teach what we want,” and they do, but all teachers are accountable to a common set of design principles, and teacher autonomy is mediated through collaboration and dialogue, as teachers routinely share their designs and samples of student work with each other. The schedule supports this sharing and other forms of collaboration, as teachers arrive at school each day one hour before the students arrive. The physical structure also supports collaboration, as well as the organizational emphasis on transparency, with moveable dividers between classrooms, flexible open spaces, and lots of glass. Students participate in defining these spaces. For example, eighth graders redesigned and rebuilt their double classroom to include counter spaces along the walls, comfortable seating, and work tables.

These are integrative structures. Bobby's school, like all HTH schools at all age levels, ignores the basic axioms, noted earlier, by which American schools separate students into "higher" and "lower" tracks, separate content into subjects (and in particular, separate "academic" and "technical" subjects), and separate school from the world at large. Instead, the school integrates students, subjects, and the arenas of school and world. Putting students from vastly different backgrounds in the same classroom poses a formidable challenge for teachers, but it is a challenge the organization embraces, rather than suffer the pernicious effects of separating children, per conventional practice, by presumed academic readiness, which in practice correlates strongly with race, ethnicity, and social class.

These structures for equity have the virtue of simplicity. Compared to the comprehensive high school, the program offers fewer choices of courses. Instead, choice has been relocated inside the classroom, as students pursue questions through projects. Teachers typically carry a student load of 60 students for core academic work. Students go to a maximum of three "stations" during the day, and often just one or two, in the case of integrated projects, making the daily and longer-term experience of schooling, not only equitable, but also comprehensible, manageable, and purposeful—the hallmarks of a well-being institution (Hämäläinen 2014). We want students, when asked what they're working on, to describe a project, rather than say that they go to math at 9:04, English at 9:52, and so on. Within such simplified, integrated structures, teachers get to know students well and build learning communities in their classrooms.

High Tech High is a principles-based initiative. Its design principles, shared across the 13 schools, offer a frame of reference for decision making across the organization. In particular, they offer a lens for examining teacher and student work, especially with regard to equity. The principle of *personalization* asks the question, with respect to teacher designs and student work, "Where in this work do we see evidence that all students are exercising voice and choice?" The overriding principle of *equity*, by which the organization commits to untracked classrooms, leads to the question, "Where in this work do we see evidence of access and challenge for all students?" The principle of *authentic work* triggers the question, "Where in this work do we see evidence that students are making authentic connections with the world beyond school?" A fourth

principle, collaborative design, raises the question, “What structures are in place to support the design work of teachers and students?”

The point here is not that other educators need copy High Tech High, but rather that the equitable and sustainable school of the future, in its various iterations, attends closely and persistently to the alignment of purpose and structure. For example, if we value authentic work, we might make field work and internships central to the program and embed support for them within the structure of the school; if we value teachers as co-designers, we must build in time for them to collaborate; if we value personalization,⁵ we might introduce an advisory program where students can be known well, or reduce the student load per teacher. Overall, if we want to fully support effective and equitable teaching and learning, a comprehensive approach is required: reconfigure the day, group students and staff together in cohorts, eliminate tracking, and reorganize the curriculum toward coherence and connection. Design principles offer a frame of reference for discussions about planning, projects, and progress in this transformation.

RETHINKING THE CURRICULUM

Early in the twentieth century, Alfred North Whitehead (1929) lamented that, while “in the schools of antiquity philosophers aspired to impart wisdom, in modern colleges our more modest aim is to teach subjects” (p. 29). Indeed, subjects are at the heart of our modern dilemma—our inability to achieve both excellence and equity—for two reasons. First, the artificiality and the arbitrary origins of subjects (Wagner and Dintersmith 2015) mean that they are not aligned with the way knowledge is used in the world, nor with its rapid expansion, nor with the current ubiquity of content via desktop and handheld devices. Second, a subject-centered approach yields a deficit model of instructional design, wherein teachers, curriculum designers, textbook producers and test developers identify “gaps” in the learner’s knowledge and develop plans to close them. Meanwhile, the “minor” subjects, such as art, music, physical education, which, ironically, are the pathway for many to deeper learning—don’t count in contemporary achievement metrics.

Of course, learning must be about something, but the content need not be siloed in “subjects.” What if, like Bobby and Allie, we conceived of the classroom as a “think-tank,” building the curriculum around problems and questions, not subjects? What if educators approached

their discipline as a lens for understanding the world, not simply as a body of knowledge to be mastered;⁶ Such an approach would help avoid the trap that Whitehead warns against—the mere transmittal of “inert knowledge” (1929, p. 32). As Whitehead insists, and as most educators would agree, what is essential for deeper learning is that the content be transformed or applied in some way (Mehta and Fine 2012). Bobby and Allie’s students effect such transformation as they research, analyze, and synthesize their findings about the ways the world might end, and propose preventive measures.

EXPERIENCE AS TEXT

Paulo Freire (1998) proposes a pedagogy of agency and transformative action in his insistence on action-reflection, the problematization of the existing reality, and, through it all, the reconfiguration of the teacher-student relationship. There are two basic propositions in Freire’s work. First, it is the vocation of human beings to transform the world according to their own purposes. Second, the role of educator is to support the educatee in understanding and acting upon his/her reality. Freire distinguishes between the concrete context—the lived experience of the participants—and the theoretical context, where teachers and students, in the “cultural circle,” unpack that reality. It is a method both dialogical and dialectical, yielding cycles of action, reflection, dialogue, and transformation.

Freire’s approach to adult literacy, through the cultural circle, is to treat the learners’ experience as text. The educator, upon careful study, selects artifacts from the lives of the learners (e.g., a slide projection of a tractor) as “mediating objects” for study and discussion. When learners then see these objects represented as written words, they begin to see that words can speak for them, and that their words and actions, can transform the world. The conviction here is that people’s experiences, from which their observations and questions emerge, are “texts” worthy of the same reverence and critical analysis that we give to tangible texts, like books, photographs, paintings, videos, and films. We see something of this approach in the work of Matt Simon and Nuvia Ruland at High Tech High Chula Vista, where students, themselves affected variously in their lives by gun violence, set out after the Sandy Hook massacre in 2012 to make *Beyond the Crossfire*, a documentary film about gun violence.

Experience as text takes a central position in internships in the world beyond school. Students in internships—and, with proper support, their teachers—see the world of work and service as a rich context for learning—not only for developing essential skills, but also for extracting critical curriculum content from the student’s experience, which serves as a text to be “read,” interpreted, and articulated in a multitude of forms. For example, Randy Scherer’s 11th grade students at High Tech High Media Arts engage in 3–4-week internships in local business and social service agencies—and publish *Ampersand: The Student Journal of School and Work* (2015), a record of their various experiences. Scherer’s students use a variety of academic and workplace tools and processes to execute and then document their internships—work logs, personal journals, observations, interviews, chronologies, technical manuals, flow charts, project proposals, instructions, letters, reports, storyboards, websites, cameras, and smartphones. They write to reflect on important learning experiences, think through problems, articulate learning goals and project goals, and share experiences with authentic audiences. Writing, often pursued as a decontextualized activity in schools, is here imbued with purpose, as the articulation and communication of personal and academic experience. Through processes of peer critique and multiple drafting, it offers a way, not only to articulate, but also to interrogate, one’s experience.

By experience, we mean not only one’s lived experience, but also the appurtenances thereto—one’s observations, perceptions, values, questions and beliefs—an aggregate of prior life experience, the experience of a current project, and one’s experience of external texts. Indeed, we want students reading and analyzing various texts, and we want them to share their experience of those texts, i.e., their observations, analysis, and especially their questions, in seminars or “cultural circles.” But if experience is the starting point, where do the “subjects” and canonic texts come into play?

Upon arriving in San Diego to teach, Stephanie Lytle noticed that there were a lot of homeless people in the streets. On learning that many were military veterans, she visited the office of the Veterans Village of San Diego to arrange a project: her students would interview veterans and create a product honoring their service and their lives. Meanwhile, Stephanie’s class was reading *Beowulf* and examining the role of the *scop*, the bard who sings the praises of returning warriors and who, in the process, functions as a healer. They decided, using the work of Anna Deveare Smith in *Twilight, Los Angeles* (2003) as a model, that each

student would compose a poem honoring their partner-veteran, consisting solely of the veteran's words as recorded in the interviews. At the same time, in teaching partner Jeremy Farson's art class, students created paintings to represent their veterans' experiences. In the end, the students invited the veterans to a ceremony at the school, where the students read aloud their poems. They then presented the poems and original paintings to the veterans, one of whom later wrote, "You listened. You didn't judge us. You didn't try to fix us. You listened and you cared. To be listened to and to be heard without being judged, to us was to be honored. Your words and your art have sacred places in our hearts." One of the students wrote, "from 'Hello, my name is...' to the actual reading of the poems, it was no longer a class project. I felt it was almost like my duty to share her story." Lytle adds: "The experience brought home to all of us the enduring power of art and stories, from the time of Beowulf to the present day. As Tim O'Brien writes, 'This too is true. Stories can save us'" (Lytle 2010). Indeed, the students were enacting the role of scop, as described in a text written 1000 years before.

Egan (2008) sees the great themes of today persisting in the school of the future, e.g., "nature, society, love, evolution, psychology, and so on..." (71). Postman (1995) suggests five overarching themes as purposive narratives for schools, three of them dealing with themes of equity or sustainability: spaceship earth, the fallen angel, the American experiment, the law of diversity, and the word weavers/world makers. To these, one might add themes of justice, truth, beauty, and fairness, along with the abiding adolescent themes of identity, social relationships, and change. At High Tech High, as students raise and pursue questions, critical societal themes emerge: gun violence, saving the beach, community health and fitness (fifth grade students constructed a parcourse; sixth grade students offered designs via Google Sketch-up for the playground at a new elementary school), species preservation (fourth grade students built and maintained a way-station for Monarch butterflies)—the list goes on and on.⁷ We need not worry about themelessness, and we will not lack for significant content, if we treat young people's experience as a primary text for reflection, articulation, and interrogation.

The challenge—and the art—for teachers is to develop generative questions in such a way as to allow connections between student experience and critical texts in the world. For example, at High Tech High, Jay Vavra and Tom Fehrenbacher's 11th grade students spent an academic year focusing on a single question, e.g., "What is the human impact

on San Diego Bay?” This question is broad and deep enough to allow a variety of topics, texts, and activities across science, math, English, and history. Art comes into play, too, as Vavra and Fehrenbacher work with students to frame the experience and design ways to share it with the larger community via a field guide and other artifacts of learning—illuminated journals, sketches, etc.—in places like the Chula Vista Nature Center, the Maritime Museum, and the San Diego Zoo. Vavra and Fehrenbacher’s students are not simply studying science and humanities, but also acting as scientists, historians, artists, editors, and curators.

Experience as text addresses a key question of equity: What gives a child “standing” in the curriculum? Who has the right to speak? Whose experiences are honored and validated? In Bobby and Allie’s project, students achieve standing by virtue of the questions that emanate from their experience. Every child has questions; the role of the teacher is to help students connect their questions to each other and to larger questions that are asked in the world beyond school. In effect, Bobby and Allie, and their students, are treating their experience as text, as a way of achieving both equity and excellence. This approach aligns with Freire’s (1998) insistence that the role of the educator is to help students both to see their own experiences and perceptions as valid and to learn to critically interrogate them.

The school of the future validates student experience as a starting point and returns to it again and again. As students engage in articulating their experiences, they discover both what is unique about their own experience and what they have in common with diverse peers. Here, we arrive at a deeper reason, both for establishing diverse classrooms and for honoring experience as text: the possibility of constructing together a shared narrative and shared purpose. As Postman (1995, p. 18) reminds us:

Public education does not serve a public. It *creates* a public....The question is not, Does or doesn’t public schooling create a public? The question is, What kind of public does it create?...The right answer depends on two things, and two things alone: the existence of shared narratives and the capacity of such narratives to provide an inspired reason for schooling.

The same applies to culture—if we see the purpose of schooling as culture creation as opposed to culture transmission, we stand a chance of resolving the supposed dichotomy of equity and excellence.

Treating experience as text offers the additional benefit of *attention*. Where the default scenario in schools is for the teacher to demand attention to a lecture or external text, experience as text flips the scenario. Now it is the teacher who pays attention to the students—a *sine qua non* for equitable teaching and learning.

COLLEGIAL PEDAGOGY: TRANSFORMING AUTHORITY RELATIONS

The term collegial pedagogy originates in Elisabeth Soep and Vivian Chavez's (2005) work with Youth Radio in the San Francisco Bay area. At Youth Radio, now in its third decade of operation, youth come together outside of school to produce professional-quality programs for National Public Radio and other outlets. Key decisions are made by the students, including what issue to explore, how to go about it, what, ultimately, to say, and how to pitch it to media outlets. It is not Soep who sets standards for the work—she acts as a colleague, not a judge. Instead, because they are engaged in work for an external audience, the students look to the world of work for professional models and develop standards accordingly. They engage in multiple rounds of drafting and critique—processes that one finds in design studios and other professional workplaces. Soep (2008) describes a phenomenon of “swarming,” when critique processes have taken hold and become part of the culture of the project. Throughout, the project attends to the expressive needs of adolescents, who emerge as agents whose questions and actions matter in the world. Here, as in the work of Freire, we see a dual transformation: of the teacher-student relationship, and of the relationship to the world. The youth radio project occurs outside of school, in the living community, but it is the kind of work that schools can and should do. The High School for the Recording Arts (HSRA) in St. Paul, MN, a public charter school serving inner city youth, is built along similar premises, as students tap their experiences and explore community issues to create and share professional quality music and art.

At its best, Bobby and Allie's work, and that of their HTH colleagues, exemplifies collegial pedagogy, based in codesign and focused on authentic questions.⁸ They understand that self-directed learning happens in a social context, and that education for equity and sustainability requires a pedagogy that fosters individual and collective agency in doing work that matters. Such a pedagogy calls for a reconfiguration of the authority relations between teacher and students. The traditional bases for

authority—subject matter expertise, training, age, and salary, however present they may be—are not sufficient. Instead, the authentic basis for authority is to be found in shared purpose and authentic work. The teacher, along with the students, is the custodian of that shared purpose.

We see this pedagogy at work in Bobby and Allie’s End of the World project, as students and teachers work together to engage in work incorporating co-design, reflection, dialogue, peer critique, and action. We also see it in Vavra and Fehrenbacher’s studies of the San Diego Bay, and in Ruland and Simon’s Beyond the Crossfire documentary. We see it in Juli Ruff’s (2010a, b) efforts to develop a culture of critique in her classroom. We see it in internships, at High Tech High and elsewhere, where the teacher/advisor serves as facilitator and another adult(s) emerges as mentor.⁹ We see it in Durango, Colorado, where students at Animas High School and Mountain Middle School sprang into action when a leak from the Gold King Mine in Silverton, CO poured toxins into Durango’s Animas River. Students went to the river, extracted and tested water samples, visited the site of the mine, consulted with local experts, and presented their findings and recommendations for future management to a local board of geologists, city officials, college students, teachers, and a representative of the Environmental Protection Agency.

Bobby and Allie’s work raises questions about teacher expertise. They cannot possibly become expert in all the topics their students are exploring. However, they are expert facilitators who can help students connect with important texts and living resources—and with each other.¹⁰ Indeed, an important quality for this type of teaching is what Edwards (2007) calls relational agency—the disposition and skill to interact with peers, colleagues, and experts far and wide. If we aspire to foster transformative action on the part of students, we need, as teachers, to model that kind of action as teachers. We also need to re-imagine and re-define key terms in the pedagogical lexicon—e.g., what does “scaffolding” mean in education for agency? In classrooms where outcomes are defined in terms of content mastery, scaffolding aims to *control* the outcomes. In education for self-directed learning, scaffolding means relinquishing control in order to foster student agency.

ASSESSMENT AS DIALOGUE

The more any quantitative social indicator (or even some qualitative indicators) is used for social decision-making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor.

—Campbell’s Law

What will assessment look like in the school of the future? Some, including the developers of the latest round of standardized assessments,¹¹ would say we are moving toward ever more sophisticated measures of student understanding, skills, and dispositions—even such qualities as “grit” and “joy.”¹² We would argue, with Campbell, that the current approach to assessment, weighted so heavily on quantitative measures, corrupts the processes of teaching and learning. The focus on standardized tests in the USA has atomized the experience of students and teachers, widening the gap between those who have access to deeper learning in schools and those who do not. Moreover, as regards qualities like grit and joy, the testing and test making process tends to put the onus on students for matters that are contextual. As our colleague David Yeager has pointed out in conversation, it is easier and more appropriate to assess students’ feelings about what their teachers are doing, and share that information with teachers in the interest of greater teacher effectiveness, than to render students wholly accountable for circumstances that are only partially in their control.

Above all, the school of the future needs to take an integrated approach to assessment, in the recognition that student work, teacher work, and school culture are interdependent. For assessment to have value in guiding learning, it needs to be formative, student-led, and dialogical, with an emphasis on growth and next steps. As such, it needs to be local. It is sheer madness to outsource assessment to distant entities (including machines for scoring), when it is dialogue that is critical to effective, useful assessment.¹³

Briceno (2013), drawing on the work of Farrington et al. (2012, pp. 108–110), discusses four “learning mindsets” as essential to academic success:

- growth mindset (“I can change my intelligence and abilities through effort”)
- self-efficacy (“I can succeed”)
- belonging (“I belong in this learning community”)
- relevance (“This work has value and purpose for me”)

Recognizing the influence of purpose, confidence, effort, and context on student performance, these mindsets suggest a framework for integrated, dialogical assessment that takes teacher work and school culture into account. Is the work authentic (a question that touches on teacher work)? How are individual students developing/not developing qualities of confidence and persistence? How are teachers themselves developing and modeling these qualities? In what ways is the school developing a culture where everyone belongs, and where does it fall short?

Assessment is an everyday process involving reflection, self-assessment, dialogue, peer critique, and revision. In Bobby and Allie’s class, the exit card is a typical instrument for daily self-assessment, reflection, and feedback to the teacher. Students may be asked, on an index card, to write one thing they’ve learned on one side and, on the other, a question for the teacher. The “something learned” may be a content item, or something about a peer, depending on the lesson. Or the questions may be, “What worked for you about today?” and “What could have been better?” The possibilities are endless; the point is that this “assessment” is mutual, offering a window into the student’s learning and providing useful feedback to the teacher.

For summative assessments, the more effective and convincing demonstrations of understanding are to be found in work that students have developed over time. At High Tech High and many other schools, students (and staff) maintain digital portfolios of their work. Students give end-of-term “presentations of learning,” where they present artifacts of their work to demonstrate and reflect on their learning: ways they’ve grown, needs, next steps, and longer range plans. Just as Bobby and Allie develop their curriculum from student questions, they also turn the assessment lead over to students. Students address questions about engagement, performance, and purpose: what worked for me in this project or experience? What felt most real and most engaging? What was I most proud of? Where did I encounter problems? Overall, what are my

strengths and needs? Where's the evidence that I have exhibited growth in one or another High Tech Middle "habits of mind"? What do I need to think about, moving forward? In most cases, students present for about 10 minutes, leaving 20–30 minutes for dialogue, as teachers, parents, and other panelists respond with their own observations, questions, and suggestions.

Some assessment practices at High Tech High are built upon traditional forms, such as the report card and the parent conference. Bobby and Allie bring student reflection and dialogue into these processes via what they call "student-led comments" (followed by teacher responses) and "student-led parent conferences." This approach differs radically from conventional assessment practice, where students complete an assignment or take a test, the teacher assesses whether learning has taken place, and all move on to a new discrete chunk of knowledge to master. And it takes time—time that many teachers would say just isn't available, given the need to "cover" the curriculum. But if we understand assessment as an episode of learning (Wolfe 1992), then it is time well spent.

Authenticity is the linchpin for what Pink (2011) calls intrinsic motivation (see also Deci and Ryan 2008; Deci and Flaste 1996). Traditionally, schools have relied on extrinsic motivators such as grades to push students to persist even when they see the work as irrelevant. If, instead, we succeed in engaging them in work that matters to them (and to the community), we can develop intrinsic motivation. Assessment then becomes a meaningful dialogue driving future learning if students are supported in reflecting on their evolving strengths and areas for growth, on which they then receive feedback and support from their teachers, peers, and parents (For an account of the elimination of grades, where students co-design as assessment of "core growth areas", see Poole 2014).

The "well-being" school asks questions about the intellectual and emotional climate for both students and staff, e.g., via school quality reviews and/or nationally normed climate assessments such as YouthTruth, which explore student perceptions about performance, belonging, adult and peer support, and preparation for the future. Once in possession of such information, the question becomes, what are we going to do about it? The answer: continue to gather information, develop action plans, and act!

DEVELOPING SUSTAINABLE NETWORKS FOR INQUIRY AND ACTION

If we want our schools to be self-renewing entities where diverse students and teachers engage in work that matters, then we need to rethink not only teaching, but also how we support teacher growth *within* schools.

The evolution of normal schools¹⁴ into university-based teacher training programs in the late 1800s, motivated by a desire to improve and standardize teaching (Harper 1939), brought with it a distinct separation between teacher education and the life of schools. Young women and men studied the subjects they would teach and were then thrust into schoolhouses to toil in isolation, with little to no teaching experience. Unlike the apprenticeship model common to many vocations, where learning happened on the job alongside a master (Smith 1998), the teacher's "education" was presumed to have ended by the time they entered the classroom.

Not much has changed since then. The typical teacher in the USA completes a university degree in education or a particular discipline and then goes on to earn a teaching credential, engaging in as little as two weeks of student teaching alongside a veteran teacher. Once hired, most new teachers discover that their schools provide little in the way of professional development or opportunities for collaboration. Occasional faculty meetings tend to focus on logistics, student support or discipline-specific planning rather than matters of instructional design or pedagogy. Teachers who wish to develop their practice are encouraged to enroll in programs of study beyond the school, thus reifying the boundaries between theory and practice.¹⁵

In this way, most schools in the USA fall solidly on the "buy it" side of what some reformers have characterized as the "build it or buy it" debate (Green 2014; Mehta and Fine, in press). As a society, we invest the bulk of our time, energy and resources in preparing teachers to enter the profession, expending very little to ensure they continue to grow as teachers and stay in the profession.

In contrast, the future school orients itself toward the "build it" side of the debate, investing significant resources and energy in supporting teachers after they have arrived. At High Tech High, for example, we place great emphasis on hiring teachers who share our commitment to serving diverse students in an integrated, project-based environment.¹⁶ We seek individuals who want to know what and how students think,

and who are ready and willing to collaborate with colleagues. However, bringing in good people is only the first step.

DESIGNING SIGNIFICANT LEARNING EXPERIENCES FOR ADULTS

Adults—and young people—learn by doing, by engaging in work that is challenging and purposeful, and through social interaction, particularly in apprenticeship with more experienced members (Dewey 1938; Lave and Wenger 1991; Smith 1998; Rogoff et al. 2001). If teachers are to “learn by doing,” it is up to schools to design “educative experiences” (Dewey 1938) for them, like the ones the teachers will design for students.

New teachers at High Tech High enter a community of inquiry that values their prior experiences and their emerging questions. Whether fresh out of a credential program, transitioning from industry, or having several years of teaching experience, they all participate in an eight-day Odyssey before school opens, which offers an immersion in HTH design principles and pedagogy. On the first day, teachers begin a two-day “Project Slice” where they experience a transdisciplinary project as a learner. Recent “slices” have included explorations of the nearby US/Mexico border, designing and building interactive toys for an orphanage in Mexico, and studying the flora and fauna of San Diego Bay. In each case, teachers do what they will later be asking their students to do: generate questions to pursue, conduct fieldwork in the community, and collaborate to create a product to exhibit, which they prototype and take through multiple rounds of critique and revision.

Throughout the Odyssey, we build in time for teachers to reflect and make meaning of this experience, identifying and unpacking the structures and pedagogical moves that have facilitated their learning. Where did they experience choice and voice? How did the instructional design and facilitation provide access and challenge for different learners? What was communicated about what HTH values? We also ask everyone to share a moment of “significant learning” from their own K-12 years and, in groups, extract from those stories the elements of significant learning. The elements are predictable: meaningful mentorship, challenge, risk, teamwork, an important audience, connection to a passion or authentic question, someone who believed in them, etc.¹⁷ We can then ask, “What would a place look like where significant learning was going on all the time?”

This constant toggling back and forth between experience and reflection serves as an introduction to a pedagogy that values experience as grist for future learning. In *Experience and Education* (1938), Dewey argued that in order for reflection to be educative—that is, to facilitate future learning and decision-making—it must be rooted in experience. This is true for both youth and adults. Too often in schools, students and teachers are asked to reflect on situations and issues disconnected from their daily lives, to engage with abstractions rather than their own experience. By creating rich learning experiences for teachers that can then serve as touchstones for the experiences they create for their own students, the future school enacts a powerful *symmetry of practice*; the adults learn as we hope the students will.

This symmetry persists in Odyssey activities that nurture collegial pedagogy and challenge traditional hierarchies in schools. Before teachers design their first project, they participate in “project tuning” or “looking at student work” sessions, where a veteran teacher brings a draft project design or samples of student work, and asks for advice. In small groups, often involving K-12 students as well,¹⁸ the new teachers follow a protocol to ask clarifying and probing questions and engage in dialogue about the work. This exercise communicates to new teachers that their perspectives matter, that as teachers we make our work and thinking public, and that we are all still learning. Moreover, by helping veteran teachers think through their questions, grounded in artifacts of teaching and learning, the new teachers identify criteria for quality work that will guide their own project designs over the week and beyond. They complete the Odyssey by giving a formal Presentation of Learning (POL), where they share their project designs and ongoing questions with peers and veteran teachers, thereby experiencing a process they will facilitate for their own students during the year.

The Odyssey serves as an introduction to the routines and rituals that undergird teacher life at HTH. Teacher collaboration is at the heart of the work—and we know that effective collaboration doesn’t just happen. Instead, we do our best to “shape the path” (Heath and Heath 2011) by providing purposeful structures and protocols,¹⁹ like the ones referenced above, that ensure all voices are heard, encourage divergent ideas, and keep conversations focused and productive. Each protocol concludes with a debrief: how the process worked, how it could be better, what “moves” the facilitator made that helped or stymied the conversation. In this way, protocols help the adults in a school hold productive

conversations and grow as facilitators of each other's learning. The more often educators engage in protocols, the more likely they are to use them with students. They may conduct a project tuning with students to elicit their ideas about an upcoming project, or have students use protocols to give each other feedback on drafts of their work or to talk through a dilemma.

While protocols have emerged as essential tools at High Tech High, they are not a magic bullet. If they are treated as a series of steps to plod through, or if participants fail to move past niceties and offer each other kind, helpful and specific critique (Berger 2003), the ensuing conversations can feel superficial and even frustrating. However, when the purpose is clear and aligned to the school's values, and when the community establishes clear norms for interaction, they can catalyze collaboration, dialogue and reflective practice. They honor the questions that arise from teachers' practice—a lesson gone wrong, a puzzling interaction, an idea for a project—in short, a “wondering they wish to pursue” (Hubbard and Power 1999).

DEVELOPING COMMUNITIES OF INQUIRY AND ACTION

What are my dreams for our school, for my students?

How do I want to grow over the next year?

If equity is at our core, what areas - in my practice and our school - are ripe for improvement?

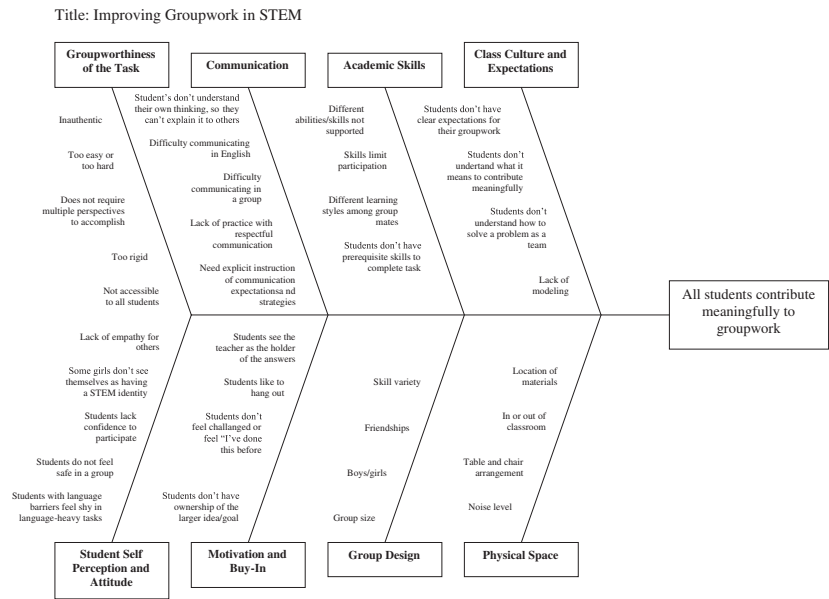
Just as Bobby and Allie's students rush in from recess to discover a provocative prompt on the board, the teachers at High Tech Elementary Chula Vista (HTeCV), arrive to their afternoon professional development session to discover the journal prompts above. The school is a few miles from the Mexican border; teachers can see the mountain ranges of eastern Tijuana from the classroom. It's no mistake that the first question is about their dreams. Sharing their dreams for students, and the ways in which they hope to grow in the coming year, is a first step in identifying areas for improvement. As with Bobby and Allie's students, several themes emerge. Teachers want to ensure *all* students are able to read and write well, articulate their thinking to others verbally and visually, participate equitably in group work, see themselves as mathematicians, persevere through challenges, resolve conflicts independently, and feel a deep sense of belonging to the school community. They want to

ensure their assessments are equitable and student-centered, and that their projects elicit deeper learning. All of these topics are worthy of inquiry and action, and all are rooted in teacher's aspirations for a more equitable and engaging learning environment.

The following week the faculty reconvenes to determine which topics will drive improvement groups, where teachers will work together for the rest of the year to dig into the problems they want to solve, set a goal for what they want to achieve, and enact "change ideas" in their classrooms in pursuit of that goal. Teachers choose from the themes synthesized from their own reflections, along with topics other HTH schools are working on already. They vote for the topics they feel are most likely to advance issues of equity, and those they are most inspired to explore. In the end, four groups emerge: Making Thinking Visible, Equitable Group Work, Student Agency, and Improving Writing Instruction. Three of these topics are already being pursued by other HTH schools, so there is opportunity for sharing ideas and learning across campuses, grade levels and disciplines. The energy is high. There are spontaneous high fives. Now the real work begins.

Over the course of several afternoon sessions, in a process initially guided by HTH GSE faculty, the teacher teams dig into their issues and develop a theory of action for moving forward. Using a protocol, they construct a fishbone diagram to unpack the root causes influencing their problem: What makes it hard for all students to participate meaningfully and equitably in group work? What affects students' abilities to persevere through challenges? Why is it difficult for students to share their thinking with the class? What makes writing challenging, and why, at such a young age, do some students already feel they are writers and others have decided they are not? Each teacher will conduct an "empathy interview" with at least one student, so that the group will have tapped into multiple perspectives on the issue. They will refine their fishbone diagrams and construct a clear and measurable aim for their project (see Fig. 4.2). And they will use another protocol to construct a Driver Diagram that articulates areas of focus and concrete change ideas they want to implement.

Moving forward, improvement groups meet every week for an hour to share the change ideas they are trying in their classrooms, analyze the data they have gathered, and plan next steps. They collect and analyze video clips of students working in groups, exit cards and short surveys, teacher observations, empathy interviews with students or samples of student work. They use a structure called a PDSA (plan-do-study-act)



HTECV Improvement Research Team, 2015-2016

Fig. 4.2 Fishbone diagram for equitable group work

cycle (Langley et al. 2009) to capture their learning and guide short cycles of inquiry, action, and reflection.

Several weeks into this work, HTECV hosts 25 principals from the New Tech Network,²⁰ who want to learn about how improvement science works at the school. They listen as teachers and students describe how the work has affected teaching and learning in the school. They help gather data for two teachers working on their latest PDSA cycle regarding equitable group work, and offer suggestions for improvement.

Three 4th graders, introduced as research collaborators in the equitable group work team, share ideas their class generated to help more students participate meaningfully in group work, and how their own behavior was affected by viewing videos of their groups working together. One boy shares, “Seeing the video made me realize that I was not great about sharing the air, so I set a goal for myself to talk less and invite others in.” A girl shares that seeing the video “made me realize that I was off task a lot more than I thought. Since then, I’ve tried

harder to not distract others.” Both report that they could see in subsequent videos that they were improving toward their goals.

These same students facilitate the debrief at the end of the day, where the visiting principals share what struck them from the visit, what questions arose, and what implications they see for their own work. At one point, one of the 4th grade facilitators looks at an adult who hasn’t spoken yet and says, “Miss Megan, I’ve noticed that you haven’t said anything yet. Would you like to?”²¹

The last question from one of the visiting principals is, “How can I get this to happen in my school?”

The simple answer is that this can happen in many ways, with many different starting points. However, it always begins with questions that are triggered by the context, and a desire to address problems in the system that lead to inequitable outcomes or detract from the student experience. For example, at High Tech High North County (HTHNC), the Director wondered why his school was among the lowest in the organization for the percentage of students applying and ultimately attending four-year colleges.²² In a school committed to ensuring all students are ready for college, career and civic life, this posed an equity dilemma for him. If more of his students, especially low-income students, were to get to four-year college and succeed there, they would have to apply. That was the first hurdle.

To explore that hurdle, the director applied to college himself. He discovered that it was much more confusing than he had assumed. As a result, he worked alongside his college counselor and the teaching faculty to implement a menu of interventions, embedding application support into the advisory program, offering workshops during lunch and after school, and inviting seniors to sit alongside their advisors during a staff day and literally complete and submit college applications (see Driver Diagram, Fig. 4.3).

Along the way, the faculty conducted empathy interviews and focus groups with students to understand the challenges they faced in applying and going to college, and surveyed all seniors to figure out which interventions students found most helpful. Upon learning that the personal statement was an obstacle for many students, they decided to embed support for writing it into 11th grade Humanities classes. After two years of concerted effort, HTHNC has increased the percentage of students applying to four-year colleges from 90% in 2015 to 98% for 2016. Within the past three years, they have gone from having the lowest to

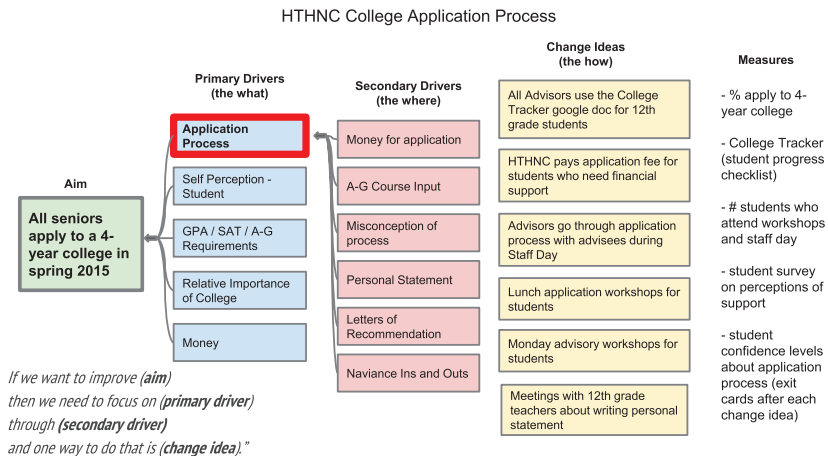


Fig. 4.3 HTHNC driver diagram

the highest percentage of students who apply—and who actually go—to four-year colleges in our organization (Jones et al. 2015) (see Fig. 4.4).

In the vignettes above, the school directors co-designed the improvement efforts with teacher leaders from their schools and faculty from the HTH Graduate School of Education (GSE). The topics that ultimately drove the work emerged from faculty’s dreams and concerns, and were grounded in a shared desire for deeper learning and equitable outcomes. And the first step was to involve and learn from students. At HTeCV, students as young as first grade are engaged as co-researchers coming up with change ideas, collecting and analyzing data, and planning next steps. Lacy Szulwalski, a School Leadership resident pursuing her Masters degree through the HTH GSE, set a goal for HTeCV to reduce waste and increase recycling. She worked with students and teachers to conduct a series of waste and recycling audits as they tried out different interventions, and eventually launched a student-led school-wide campaign called My Actions Matter, which culminated in a student-illustrated children’s book (Szuwalski 2015).

In a non-High Tech High environment, Ashley Vasquez, a second grade teacher at the Finney Elementary School in Chula Vista and M.Ed. student at the GSE, engaged her students in a series of service learning projects, hoping to demonstrate that young children could make



Fig. 4.4 Illustration of the HTHNC process

meaningful contributions to their community (Vasquez 2012). Working in collaboration with the local fire department and children’s hospital, her students designed a fire safety campaign for local families and organized a toy drive for children in the cancer ward. She found that these opportunities increased the frequency and quality of peer collaboration and engagement in the classroom, and bolstered students’ belief that they could be “change makers” in their predominantly Latino, low-income community. She also discovered that this work led to increased writing proficiency and fluency because students were eager to reflect on what they were learning and make their writing as polished as possible for an external audience. In short, they saw the relevance of their work beyond the classroom.

Whether teachers are working in more homogeneous schools, like Ashley’s, or in schools that are diverse and integrated by design, like HTH, questions of equity are at the core of meaningful school change. The good news is that such questions emerge naturally in schools all the time. The bad news is that they are usually pushed aside. The task of the future school is to embrace these questions and support educators, students and communities in grappling with them. We have found the following guidelines helpful in organizing our work, and propose them as useful for the future school as well:

- **Excavate.** Support educators and students in critically examining their own beliefs, practices, and the systems in which they live and work.²³
- **Disrupt.** Use disciplined inquiry to disrupt predictable patterns of success and failure, and the inequitable practices that perpetuate them.
- **Design.** Engage colleagues, students, and communities in designing strategies and transforming systems to create more equitable, engaging learning environments for young people and adults.

We have found improvement science (IS) to be a promising framework for scaffolding and focusing this work, particularly as our network of schools has grown.²⁴ Building upon other forms of practitioner research—such as action research and design-based research—IS assumes practitioners, as insiders, are in a unique and powerful position to both contribute to the knowledge base and use that knowledge to improve teaching and learning (Caillier 2008). It resituates educators and young

people as the designers of change efforts, not simply the beneficiaries or implementers of others' ideas. At its best, it cultivates the dispositions we are after: the impulse to learn with and from students, to ground our reflections and next steps in evidence of student learning and engagement, to engage in reflective conversations with colleagues, and to look to existing research and craft knowledge to identify best practices and adapt them for our own contexts.

At the core of this work are three questions (Langley et al. 2009): What is our goal? How will we know if we've met our goal? What innovations can we introduce into the system that might lead to meeting that goal? The questions are simple, yet profound. Most educators have no shortage of ideas, and are constantly reflecting on their practice and making adaptations that they hope will better serve students (i.e. the third question). However, we don't always take the time to set a clear, measurable goal and identify how we will know if we are making progress toward it, let alone develop systematic ways for tracking progress. The future school, in its attention to coherence and shared purpose, attends to all three questions and creates structures within the school day for teachers to engage in this work.

Since our inception, we have been committed to teacher inquiry, and interested in how knowledge from such inquiry spreads. We have discovered, not surprisingly, that the degree to which teacher learning and effective practices spread is largely dependent on the social capital, or individual relational agency and influence, of the people involved in the inquiry (Moolenaar et al. 2014). In addition, as we have grown, we have recognized significant variation in relation to core practices that support a deeper learning pedagogy, such as peer critique, presentations of learning, assessment for growth, equitable group work, project design, and collegial coaching. All of this necessitates that we find effective ways to act collectively, to ground educators in our organization's values and aspirations from the beginning and help them learn from each other.²⁵ The goal for the future school as a sustainable community of inquiry is, as Deming (1986) has said, "to improve constantly and forever".²⁶

CONCLUSION: IT STARTS WITH THE ADULTS

We have proposed to blow up the schedule, change the subject, tear down the walls, and recast the role of teachers. We have proposed that schools treat experience as text, engage in collegial pedagogy, connect with the

community, and conduct assessment as a dialogue, recognizing in each of these domains the interdependency of the learner and the learning environment. We would situate teachers as researchers, challenging current hierarchical notions of knowledge about teaching and learning—what it is, and who creates it. Recognizing that classrooms and schools are dynamic systems, we have suggested possible design principles rather than a fixed model, and have insisted on assessment as integrated and dialogical, focusing on the quality of learning, the quality of life, and the health of the organization.

Tapping the enormous capacity of teachers and students, the future school integrates theory and practice, engaging in cycles of reflection, inquiry, and action to address questions of equity and sustainability. It prepares individuals to work on those issues throughout their lives in a multitude of contexts. In the end, practitioners and students come to see school itself as a project, aimed at the transformation of self, school, and society.

Taken together, these notions represent a substantial paradigm shift, yet there is nothing new in the particulars. Approaches such as Socratic seminars, apprenticeship models, inquiry-based learning, field work, maker spaces, creative distance learning, service learning, and teacher research are going on all over the world. But too often, these activities happen at the margins of the educational landscape—in particular classrooms, in after-school programs, or as “enrichment,” unconnected to a broader enterprise or larger purpose.

We argue for the *centrality* of these activities—that they should move from the margin to the mainstream. Much of the current “reform” movement, even in newly created schools, is parked within conventional structures, subjects, and assessments. Still, there are grounds for optimism. The experiences of places like Trigg County, Kentucky, ChiTech Academy in Chicago, the internship-based schools founded by Big Picture Learning, and the High School of Recording Arts (HSRA) in St. Paul, Minnesota, to name just a few, indicate that a transformation is well underway in a variety of communities and contexts. The revolt against relentless standardized testing offers similar grounds for hope (Abeles 2015).

One thing is certain—there will be no transformation without changing the conditions of work for teachers, whose role is vitally important and widely ignored. In the future school as we imagine it, adult learning mirrors student learning, as teachers and students co-design projects of

lasting value that transcend disciplinary and spatial boundaries. Teachers engage in collaborative lesson design, share dilemmas of practice, examine student work together, and engage in collective inquiry and action. The latter is particularly important because it equips teachers—and organizations—to adapt to a changing environment. It addresses the issue of sustainability for innovative schools, building the kind of culture that can survive the departure of visionary, charismatic leadership.

Education is, and has always been, cultural action, for better or worse. And the context has too often been one where policy makers and communities have acted to constrain school culture—to narrow the available options and limit teacher autonomy and agency. As documented in the film, *Most Likely to Succeed*, the current structures, curriculum, pedagogy and assessment emanate from the needs and assumptions of industrial society, for which they are well suited. They are not well suited, however, for the global information age.

Subject matter silos, standardized testing, alienation from the community, and the disconnect between theory and practice have generated a perfect storm of irrelevancy in our schools. Where they ought to unleash energy, schools tend to constrain. The principles for a sustainable school fly in the face of our test-saturated culture, offering an alternative vision of what matters—not performance on standardized tests, but the purposeful interactions between people in diverse environments and the quality and authenticity of the work they are engaged in.

Public schools, whatever their shortcomings, remain the linchpin of social cohesion—the one place where individuals from all walks of life—rich or poor, urban or rural, male or female, all races and ethnicities, all religions, all sexual orientations, all talents and abilities—come together. As such, schools have a responsibility to serve all students and to serve the greater good, and to pursue questions attendant to those purposes.

Even the most equitable schools cannot themselves resolve the large issues we face, but they can model shared vision and collective action. As micro-societies, they can enact personal empowerment, democratic processes, design thinking, an emphasis on production as opposed to mere consumption, a focus on sustainability, connections to community, and the development of human and social capital. Both by example and by their action in the world—and by their determination to sustain and renew themselves as equitable communities of inquiry—they can play a critical role in the transition to a sustainable well-being society.

NOTES

1. For footage of an exhibition night at High Tech High, see the documentary film, *Most Likely To Succeed*, accessible for community viewing via <http://mltsfilm.org/>.
2. For an overview of research activities at the High Tech High Graduate School of Education, visit <https://hthgse.edu/crei/overview/>.
3. Paul Batalden is the original source of this comment, a variation on Arthur Jones's remark, "All organizations are perfectly designed to get the results they get," quoted in Hanna (1988, p. 36).
4. The aim is to develop schools and classrooms that are intentionally integrated across a range of ethnicities, identities, social class backgrounds, and life experiences—and to demonstrate that in such an environment everyone benefits and no one is harmed. Residential segregation in San Diego County is so prevalent that postal codes are a reliable proxy for race, ethnicity, and social class. Of the 5158 students in HTH schools in 2016, 31% are Caucasian, 41% Hispanic, 9% African-American, 12% Asian, 2% Pacific Islander, and 4% Native American; 46% qualify for free or reduced lunch, 13% are on special education plans, and 8% are classified as English learners.
5. We distinguish between personalized learning, where students exercise voice and choice and pursue their questions and passions, and individualized instruction, where the teacher, or computer program, engages in a process of diagnosis and prescription for students working alone.
6. See Riordan and Rosenstock (2013) for a brief exploration of possible projects that integrate the disciplines in this way.
7. See the High Tech High website at hightechhigh.org/projects for descriptions of hundreds of projects. See also the digital portfolios for each HTH teacher, also available at www.hightechhigh.org under K-12 Schools.
8. Notably, it is student questions, not student interests, that inspire the curriculum. With interests, students and teacher gravitate toward what they already know; with questions, they gravitate toward what they don't.
9. For a student account of the transformative power of internships, see Del Rosario (2015).
10. For a practical discussion of equitable group work in heterogeneous settings, see Cohen and Lotan (2014).
11. For an overview, see Ravitch, D. (2016). Solving the mystery of the schools. *New York Review of Books*, LXIII, 5, March 24, 2016, 34–36.
12. Zernike, K. (2016). Testing for Joy and Grit? Schools Nationwide Push to Measure Students' Emotional Skills. *New York Times*, February 29, 2016.

13. There remains the question of assessment for purposes of making public policy. Here, given the way that testing disrupts and distorts the learning process, simple structures are best. The sampling methods embedded in the National Assessment of Educational Process are sufficient for policy-making purposes.
14. Normal schools emerged in the 1830s as a teacher training ground for women, who were largely excluded from male preparatory academies. Prior to this time, teaching was a largely male profession where anyone with passable literacy was allowed to teach (Harper 1939).
15. There is ample criticism of virtually all aspects of current teacher training and development, including the disconnect between theory and practice as reified in the school-university divide, in-school hierarchies (new vs. veteran teachers, vocational vs. academic teachers), the hegemony/exclusivity of subject-oriented teaching, the dearth of innovative clinical sites, and inadequate or non-existent provision for teacher growth in schools. See, for example, Sarason (1993), Levine (2006), Sizer (2008), and Mehta and Schwartz (2014).
16. At HTH, prospective hires go through a rigorous “Bonanza” where they spend a full day teaching demo lessons, interviewing with faculty and students, engaging in group discussions of provocative texts that surface important issues of equity and social justice, and collaboratively designing an interdisciplinary project for an authentic audience. Throughout this process, we look for evidence of the dispositions we care about - an eagerness to ask questions, listen to students, collaborate with colleagues, reflect on their own experience and work, tolerate ambiguity, and overturn traditional power structures in the classroom.
17. Not surprisingly, many of the moments people describe happen outside of school and in less formal environments in the outdoors, in clubs, or on sports teams.
18. See Krueger (2014) for an account of 6th graders’ participation in professional development activities.
19. The use of protocols builds on a legacy of progressive education embodied by Ted Sizer’s Coalition of Essential Schools. MacDonald (2007) and the School Reform Initiative (<http://www.schoolreforminitiative.org>) are rich repositories of wisdom and protocols for all occasions.
20. The New Tech Network, along with High Tech High and several other organizations, is part of the Hewlett-funded Deeper Learning Network, which includes over 500 schools in the USA, serving over 227,000 students.
21. The student comments reported here come from a range of students, from middle class to low-income, white to Hispanic, all of whom have internalized the norms for effective group work and are capable of guiding adult conversation.

22. This was particularly troubling given that in CA, one in 10 kindergarteners from a low-income family will actually earn a 4-year degree (Darling-Hammond 2010), and only 13% of low-income students who begin at a 2-year college will earn a 4-year degree within 6 years (Cahalan and Perna 2015).
23. At the Deeper Learning 2015 conference in San Diego, Dr. Chris Emden of Teachers College, Columbia University and Director of Science Education at the Center for Health Equity and Urban Science Education, spoke passionately about the need for teachers to excavate, or unpack and critically examine, the manner in which they engage with students and the ways in which their own assumptions, experiences and bias perpetuate inequities in the schooling system. He argued for a “reality pedagogy,” which empowers students to engage in this excavation alongside teachers, so that together they can construct learning environments where all voices are heard, all experiences are honored and knowledge is co-constructed. For a discussion of particular strategies Chris identified that teachers can use, see this blog post from a participant: <http://ghsinnovationlab.com/2015/04/02/deeper-learning-2015-day-1/>.
24. About 165 (28%) HTH staff, including directors, teachers, site managers, college counselors, etc. are actively engaged in improvement work. For those interested in learning more about improvement research in education, we recommend Bryk, Gomez, Grunow and LeMahieu’s book, *Learning to Improve: How America’s schools can get better at getting better* (2015).
25. For discussions of why improvement science is particularly well-suited for taking innovations to scale and creating knowledge that will work across multiple contexts, see Silva and White (2013), and Bryk et al. (2011). For discussions of how improvement science challenges traditional approaches to educational research and educational reform, see Jones et al. (2015), Donovan (2013), Gutiérrez and Penuel (2014).
26. Readers may access tools and protocols for engaging in improvement work here: <https://hthgse.edu/crei/protocols/>.

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Web Resources

- Collegial Coaching Hub: <http://collegialcoaching.weebly.com/>.
- High Tech High Home Page: www.hightechhigh.org.
- High Tech High Graduate School of Education: <http://gse.hightechhigh.org/>.
- School Reform Initiative: <http://www.schoolreforminitiative.org/>.
- YouthTruth: <http://www.youthtruthsurvey.org/>.

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Transforming Our Worldview Towards a Sustainable Future

Erkka Laininen

NEED FOR A PARADIGM CHANGE

Stuck on Economic Growth

“Making progress towards (sustainability) is like going to a country we have never been to before... We do not know what the destinations will be like, we cannot tell how to get there, we are not even sure which direction to take” (Prescott-Allen 2001). The journey to the future is a learning process shared by everyone: learning *and* creating our common future at the same time.

However, there seems to be a great obstacle narrowing our scope of learning. We seem not to get rid of unsustainable behaviour patterns in our daily lives. Time after time we manage to collectively create results nobody wants. This is true with regard to environmental and social problems, for instance, climate change and refugee waves sweeping over Europe. These problems, and the unwanted results seem to be linked to our narrow understanding of the complex interactions between

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environmental, social, economic and cultural issues. But this does not explain the continuing bad decisions and detrimental behaviour patterns; we do not seem to learn from our mistakes.

Science has given us a framework for continued and stable existence that has become undeniable: the only way we can thrive on this planet as a species is by making ecological sustainability our first priority. Without a well-functioning biosphere there can be no society. And without a functioning society, there can be no stable economy. This framework makes clear that in a sustainable world, economy is subsidiary to ecological and social sustainability (Salonen and Konkka 2015).

Despite the alarming trends stemming from global warming and degradation of ecosystems, the imperative of economic growth holds steady as the first priority for national and global development. New sustainable development goals of the UN Agenda 2030 (United Nations 2015) are based on the idea of green and just growth, which can provide fundamentals for fulfilling the basic needs for all people on our planet. The 2015 UN Climate Change Conference in Paris also ended up seeking solutions from the green growth paradigm. However, development models that do not have economic growth as the basis for the solution seem to be politically incorrect.

Is Absolute Decoupling Only Wishful Thinking?

Is there a sound scientific basis for expecting green growth to provide a sustainable solution for the future? The short answer is: probably not. The success of green growth depends on the possibility of absolute decoupling of material consumption and greenhouse gas emissions from economic growth.

A study based on the analysis of material flows associated with global production and consumption networks of 186 countries concludes that “achievements in decoupling in advanced economies are smaller than reported or even non-existent. ... By calculating raw material equivalents of international trade, we demonstrate that countries’ use of non-domestic resources is, on average, about threefold larger than the physical quantity of traded goods” (Wiedmann et al. 2013). This result implies that improvements in advanced nations measured by the Domestic Material Consumption indicator (DMC) have been mainly based on shifting abroad the manufacturing and indirect raw material flows due to extraction of natural resources (Joutsenvirta et al. 2016).

According to the Low Carbon Economic Index 2016 (PwC 2016), in 2015 a 2.8% decline in the global energy-related carbon-intensity (ratio between greenhouse gas emissions and GDP) was realised, which is the steepest improvement in the history of the index. Despite this, there is still a big gap between current progress and what is needed to meet the 2 °C carbon budget set by the Intergovernmental Panel on Climate Change (IPCC). Based on expected global GDP growth of approximately 3%, keeping us on the 2 °C trajectory would require an annual decline of 6.5% from this point to the end of the century, every year. [Note: The Paris Climate Change Conference agreed even more strict target of 1.5 °C, which puts extra pressure to the decline of carbon intensity.]

The challenge of decoupling should also be considered from the viewpoint of two growth factors: first, per capita energy consumption is estimated to increase in many developing countries, especially India (International Energy Agency 2015); second, the world population growth concentrated in developing countries will still be strong resulting in almost 10 billion people by 2050 (United Nations, Department of Economic and Social Affairs 2015). If these countries will go through a rapid development of economic growth and material consumerism, the multiplication of per capita energy and resource use and population growth becomes unbearable.

In our capitalistic economy and modern society, economic growth is strictly tied to the use of energy and material consumption. There is no such thing as nonmaterial growth (Joutsenvirta et al. 2016). Every service we use is linked with physical tools like manufactured goods, computers, data networks, roads and vehicles, buildings, energy production facilities and networks, etc. Even the green promise of digitalisation is possible only through large-scale energy use and excavating and processing of metals and scarce minerals for devices, which in turn is not possible without the use fossil fuels. In addition, the development of digitalisation requires constantly renewed devices, which even if recycled, require energy-intensive processing to become new products.

Are Renewables the Solution?

An important factor undermining the potential of renewable energy sources to maintain economic growth is the fact their EROEI-ratio (Energy Return on Energy Invested) is considerably lower than the one

of fossil fuels. (NOTE: hydropower is an exception, but almost all available resources are already in use.) Also the fossil fuel reserves for current and future production show declining EROEI-figures as the new sources become more difficult to utilise. This makes it difficult or even impossible to achieve positive economic growth figures, as several authors have noted (Vadén 2010; Joutsenvirta et al. 2016; Matutinović et al. 2016).

Heinberg (2015a, b) argues that in building the renewable energy infrastructure to stop global warming, we are actually involved in one of the greatest change projects in human history. In addition to solar panels and wind turbines, we have to build an alternative transport infrastructure, farming procedures and industrial processes. This transformation cannot happen without fossil fuels. For instance, production of concrete structures and steel elements require amounts of energy that is only feasible to produce with fossil energy. Production of solar panels requires scarce and expensive minerals which must be excavated, again requiring the use of fossil fuels.

Thus, the harder we push towards a renewable energy system, the faster we have to use fossil energy for the construction process. This is not only expensive, but also an undermining factor for our efforts to cut global emissions. Heinberg (2015b) remarks that the cost of building this new energy infrastructure is seldom counted in transition proposals, which tend to focus just on energy supply requirements. He concludes that “All of this taken together suggests that the energy transition will inevitably require not only time, investment, and the replacement of an extraordinary amount of infrastructure, but profound economic reorganization as well”.

Playing with Our Common Future

Some economists have awakened to the call for a paradigm shift from our current economic models. Manfred Max-Neef (2010) has concluded that for the first time in human history several crises are converging simultaneously: human-induced climate change, the end of cheap energy, extensive depletion of key resources basic to human welfare as well as the speculation bubble that is 50 times larger than the real economy of goods and services.

Max-Neef argues that what we are going through at the present time is not just an economic-financial crisis, but a crisis of humanity. He points out that most economists do not consider the fact that

economy is a sub-system of a larger and finite system, the biosphere, and hence permanent growth is impossible. Globalisation and free trade based on securing the interests of corporations and capitalists have also created human rights issues, e.g. with regard to the use of underpaid child labour and other forms of slavery. According to Max-Neef, the dominant economic growth imperative and consumer based conception of wellbeing are to a great degree responsible for the world's collision course and that the paradigm shift requires "turning away from economic growth at any cost".

Matutinović et al. (2016) have investigated the possibility that early capitalist economies, those that industrialised first, may be reaching the growth plateau naturally, in a similar way to other complex systems in nature. Empirical findings of the study suggest that the observed groups of capitalist countries may have terminated their historic phase of intensive economic growth and are entering the mature stage.

Matutinović et al. conclude that:

...it questions the usefulness of pursuing active growth policies in the North: forcing economic growth and, consequently, extending the exploitation of fossil fuels into the unconventional oil and gas reserves will only postpone the problem for a few decades as well as creating multiple adverse environmental and climate consequences. Instead, a more reasonable political agenda would be devising 'post growth' institutional solutions.

Albert Einstein has said "We cannot solve our problems with the same thinking we used when we created them". What we can conclude is the fact that mankind is taking an existential risk of disaster if we do not have any alternative plans for an economic growth model in the form we currently understand and practise. We do not have a plan B. Why do we act in such an unintellectual way despite the fact that we have firm scientific evidence on the priorities for decision-making?

IN FRONT OF THE ICEBERG

Seeing Beneath the Surface

Peter Senge (1990; Senge et al. 2012) has used the Iceberg-metaphor to illustrate thinking gaps and learning challenges of the human mind (Fig. 5.1). It is typical for us to focus on *events* with directly observable

factors—like the tip of the iceberg above the sea surface. We are very good at making instant conclusions based on what just happened and what we saw. However, at the same time we often miss the more fundamental factors behind the events and thus our conclusions (and actions) are often misleading or invalid, and may be detrimental to finding solutions.

According to Senge, the visible parts of the iceberg are usually only symptoms of something larger. The important factors behind the events are hidden, like the body of an iceberg beneath the surface which contains 90% of the total mass of the iceberg. Instead of directly reacting to events, we should stop and try to recognise *patterns or trends* related to the event: has this or something similar happened before?

These findings can lead us to factors and forces that have influence on the occurrence of the event. A deeper analysis of the *systemic structure* and operation of these factors and forces may reveal the whole picture of the problem.

The bottom of the iceberg has still one deeper level: *mental models*, which are concepts, assumptions and generalisations through which we interpret the world, take actions and make decisions (Senge 1990). According to Senge, human beings are creatures of interpretation: “Our behaviour and attitudes are shaped by our mental models: the images, assumptions, and stories that we carry in our minds of ourselves, other people, institutions, and every aspect of the world” (Senge et al. 2012).

With regard to sustainability issues, identifying patterns, trends and systemic structures behind the problems and phenomena are important for finding solutions. However, our fixed mental models can often lead to malfunctioning solutions or negative externalities. Groups, organisations and societies develop shared mental models which shape our thinking and behaviour. Examples of these models are “a good citizen is a good consumer” and “GDP growth equals increased national wellbeing”.

These mental models have enormous power in shaping our individual behaviour and the behaviour of societies. They are usually tacit, and they exist below the level of awareness. Therefore, they remain untested and unexamined without a conscious effort to do so, and limit our ability to change. Senge suggests open dialogue and reflection of mental models as the means for creating better understanding between people and finding solutions to our complex problems.

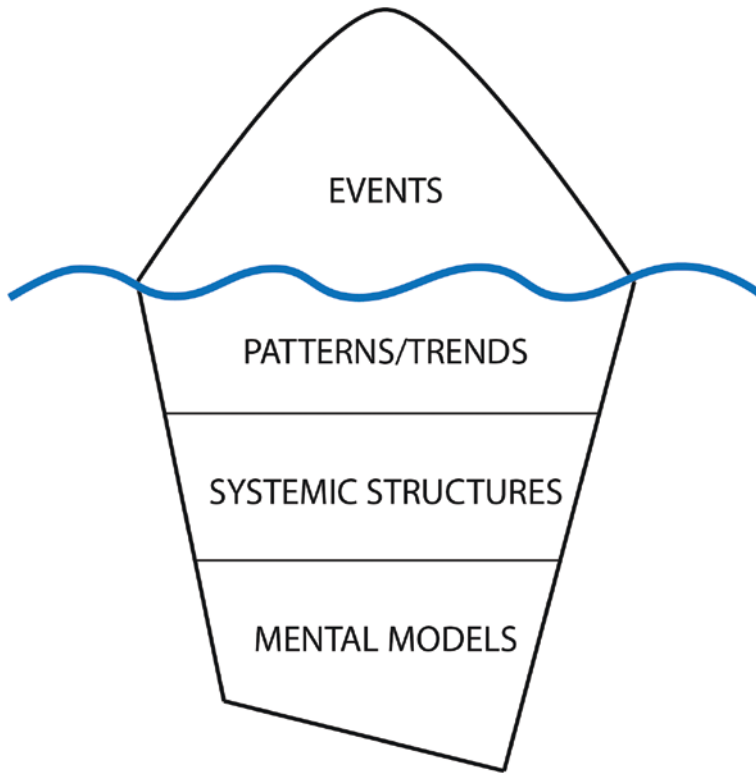


Fig. 5.1 The structure of the Iceberg diagram adapted from Senge et al. (2012)

Do We Have a Blind Spot?

In front of the emerging sustainability crisis, we are all passengers on board of Titanic approaching the iceberg. We are in the phase of gradually understanding the nature of its body beneath the surface. We have been able to reveal the patterns, trends and systemic structures related to major environmental problems like climate change. But what about our mental models? Are there signs of change in our policies, decisions and behaviour?

The answer is yes and no. We have awakened to the fact that we must change our course sharply to avoid colliding with the iceberg. We have

recognised that our current production-consumption patterns based on fossil energy and disposable items are unsustainable. So, there is a cultural change emerging towards renewable energy and circular economy. These can be considered positive results of changing mental models. But what if these changes are not strong enough to avoid confronting the iceberg? What if there is something more, something that is even deeper than mental models hidden in the body of the iceberg beneath the surface?

ON BOARD THE TITANIC

Transformative Learning

Transformative learning is a concept originally developed by adult educationist Jack Mezirow (1978). Several authors have elaborated the theory, but there is no uniform understanding of its content and no generally accepted definition for the concept. O’Sullivan et al. (2002) have proposed the following definition which has also been adopted by the Transformative Learning Centre in Toronto:

Transformative learning involves experiencing a deep, structural shift in the basic premises of thought, feelings, and actions. It is a shift of consciousness that dramatically and permanently alters our way of being in the world.

Sterling (2003, 2010) considers the lack of transformative learning being the main reason for the inefficiency of environmental education. The problem is partly systemic: our current education systems are based on societal paradigms with fixed conceptions of metaphysics, worldviews and values. It is not the purpose of education and learning to question them.

According to Sterling (2010), there is a need for a new educational approach that might “take us to the depth of things”. By the deeper levels of knowing and meaning Sterling refers to metaphysical conceptions, worldviews, values and beliefs on which our operative norms, theories and actions are based (Fig. 5.2).

Bateson (1972) has distinguished three orders of learning and change which are related to cognitive learning, meta-cognitive learning and epistemic learning (Table 5.1, presented by Sterling 2010). In addition to the learning of individuals, the model can be applied to organisational

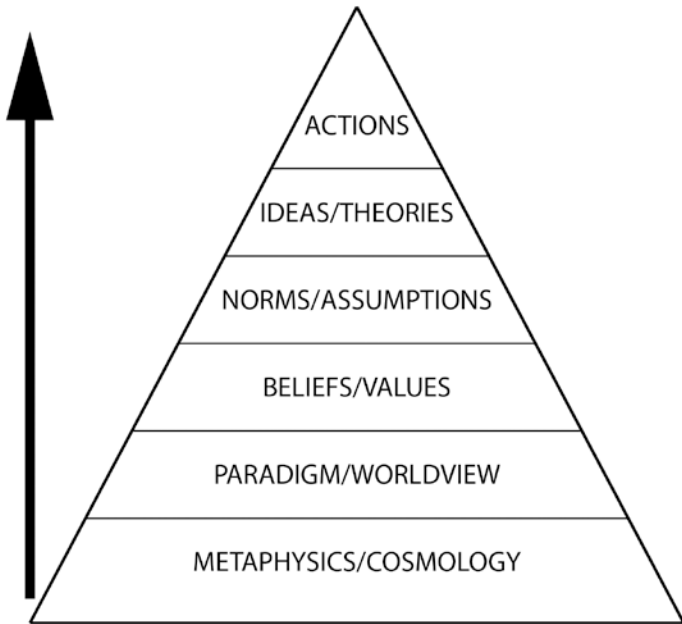


Fig. 5.2 Levels of knowing adapted from Sterling (2010) based on systems view of thought (Bohm 1992)

Table 5.1 Levels of learning by Sterling (2010)

| <i>Orders of change/learning</i> | <i>Seeks/leads to:</i> | <i>Can be labelled as:</i> |
|--|---------------------------------------|---|
| First order change <i>Cognition</i> | Effectiveness/Efficiency | “Doing things better” Conformative |
| Second order change <i>Meta-cognition</i> | Examining and changing assumptions | “Doing better things” Reformative |
| Third order change <i>Epistemic learning</i> | Paradigm Change | “Seeing things differently” Transformative |

change. According to Sterling (2010), the first-order learning or change refers to doing “more of the same”, that is, learning or change within particular boundaries and without examining or challenging our assumptions or values behind our actions or thinking. He points out that most

learning promoted in formal education in schools and higher education is of the first-order variety. Sterling (2003) compares this type of learning as “not seeing the wood for the trees” which equals learning inside the current operative paradigm.

Second-order learning is more challenging and involves the learner (or learning organisation) critically examining, and if necessary changing, beliefs, values and assumptions. This perspective can be described as “stepping out and seeing the wood as a whole” and “having some idea of an alternative wood”, which equals learning on the paradigm level (Sterling 2003).

The third-order learning, *epistemic learning*, involves a shift of epistemology or operative way of knowing and thinking that frames people’s perception of and interaction with the world. According to Sterling (2003), the third level of learning means taking a helicopter view and “seeing fully that a number of alternative woods or paradigms exist and may be chosen between” (metaparadigm level).

The Epistemological Error

The three levels of learning described above arouse a question of the required epistemic changes in our thinking that would enable us to find a more sustainable paradigm for our common future. Bateson (1972) suggests that the Western thought has been characterized by “epistemological error” which he considers being the root for ecological crisis:

When you separate mind from the structure in which it is immanent, such as human relationship, the human society, or the ecosystem, you thereby embark, I believe, on fundamental error, which in the end will surely hurt you.

Bateson’s notion has its roots in the modern, dualistic worldview that replaced the perception of man being an integral part of nature. Separateness as an operative way of knowing and thinking reflects itself all around in the Western culture. We see our relations as win-lose games instead of win-win possibilities. We focus on parts of the system instead of their relations. We separate social and economic systems from nature, and base our decisions on reasoning with a false assumption of separateness of emotions and values. We believe in objective truth instead of accepting the existence of several, subjective explanations for reality.

According to Sterling (2003), the tension between the parts and the whole—the dominant mechanistic and the alternative organistic worldview—lies in the heart of this epistemological battle. Sterling suggests the postmodern ecological worldview as the solution for a new sustainable paradigm. He provides an illustrative picture of the epistemic ways of perception behind our dominant Western paradigm (Decontextual Separation) and ecological worldview (Co-creation in Context) (Fig. 5.3).

The Co-Creation in Context perspective means deep understanding of mutual dependence of all living organisms and systems. As Sterling (2003) puts it:

The former [decontextual separation] position gives rise to a deep-seated belief that the wellbeing of the isolated part is won in struggle against other parts; the latter [co-creation in context] gives rise to the conviction that the wellbeing of the part depends on the wellbeing of the whole and vice versa.

Challenging Our Worldview

Let us return to the Titanic. Could it be so that cognitive and meta-cognitive levels of learning including understanding the patterns, trends and systemic structures as well as reflecting our mental models are not enough to avoid crashing into the iceberg? What if we concentrate on the iceberg and our ship and ignore the existence of the sea around us?

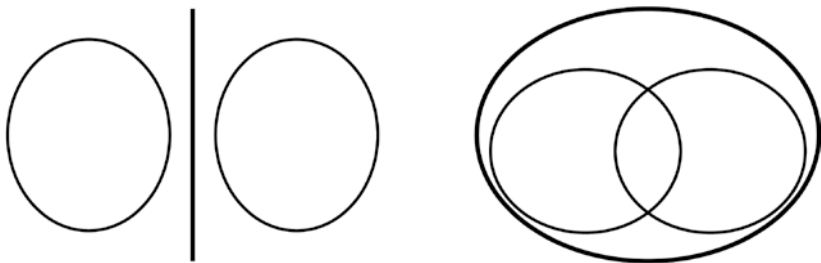


Fig. 5.3 I-It: Decontextual Separation (left) and I-Thou: Co-creation in Context (right) relationships (Sterling 2003). I-Thou relationship is based on the work of Austrian-born Israeli philosopher Martin Buber (“Ich und Du” 1923; English translation “I and Thou” 1937)

The sea in the Iceberg metaphor represents the deepest roots of our thinking, our epistemic and metaphysical conceptions of the world and existence. What does the sea consist of? In Western cultural history, there are several factors that have shaped our metaphysical understanding, worldview and development of our societies. Norgaard (1994) lists five metaphysical premises that are dominant in Western culture, and, as he argues, “help explain the cultural and biological destruction associated with modernism”:

- Atomism: Systems consist of unchanging parts and are simply the sum of their parts.
- Mechanism: Relationships between parts are fixed, systems move smoothly from one equilibrium to another, and changes are reversible.
- Universalism: Diverse, complex phenomena are the result of underlying universal principles which are few in number and unchanging over time and space.
- Objectivism: We can stand apart from what we are trying to understand.
- Monism: Our separate individual ways of understanding complex systems are merging into a coherent whole.

Table 5.2 summarises some implications of how the above-mentioned premises have influenced our understanding of the world around us.

An important observation by Norgaard (1994) is the fact that the five metaphysical and epistemological beliefs underlying modern rationality are rarely the basis for thought and action by individuals, families and small groups. Yet these suppositions are the only ones which are publicly held acceptable for use in public discourse and decision-making. Norgaard calls this commonly accepted cultural worldview as “Western public rationality”.

There is fresh evidence of the diverging public and individual conceptions in Finland. There is a uniform understanding across the political parties (including opposition) that Finland needs first and foremost economic growth to be able maintain the wellbeing of society. When Finnish individuals of all ages were asked their view on the presumption “Continuation of the wellbeing of people can only be based on economic growth”, 38% agreed and 39% disagreed (Apunen et al. 2015). In summer 2016, only 15.1% of 15–29-year-old Finns agreed the presumption and 46.2% disagreed (Salonen and Konkka 2017).

Table 5.2 Factors that have shaped the metaphysical understanding and worldview in Western culture

| | |
|---|--|
| Philosophical and scientific worldview (and metaphysical conceptions) | <ul style="list-style-type: none"> • Atomistic and mechanistic worldview • Fragmented, positivistic and reductionist conception of knowledge and sciences |
| Form of organisations and societies | <ul style="list-style-type: none"> • Formation of societies and organisations based on the above-mentioned conceptions (industrial age society) |
| Relation between humans and nature | <ul style="list-style-type: none"> • Conception of human as a master and tamer of nature • Conception of hierarchy between economy, wellbeing and ecological sustainability (priorities: 1. economy, 2. wellbeing, 3. ecological sustainability) |
| Conception of wellbeing and economy | <ul style="list-style-type: none"> • Materialistic wellbeing conception • Techno-optimism as the basis for solving economic, wellbeing and environmental problems • Economic growth paradigm • Globalisation |
| Conception of humanity | <ul style="list-style-type: none"> • Conception of humans as consumers • Conception of humans as maximizers of their personal utility/value (and that this leads automatically to common good) • Competitive society |
| Conception of mind & thinking | <ul style="list-style-type: none"> • Conception that human mind and thinking is a closed, conscious and pure rational and cognitive system |

Truly Transformative Change

How do the different orders of learning and change manifest themselves for example, in the case of climate change? Table 5.3 below lists the three orders of learning as described by Sterling (2010) with examples of responses to climate change. During the past decades, our responses have mainly been conformative and incremental. The industrial sector has focused on improving its processes to produce more items with less material and energy consumption. Consumers have been instructed to segregate and recycle their waste. Logistics have been optimised mainly to achieve cost savings, but at the same time, improvements have been made in cutting emissions. Emissions trading schemes can also be included as a conformative approach.

Table 5.3 Examples of responses to climate change adapted from the orders of learning (Sterling 2010)

| <i>Orders of change/learning</i> | <i>Can be labelled as:</i> | <i>Response to climate change, examples</i> |
|--|---|---|
| First order change <i>Cognition</i> | “Doing things better” Conformative | <ul style="list-style-type: none"> • Energy/material efficiency • Optimisation of logistics • Recycling • Emission trade |
| Second order change <i>Meta-cognition</i> | “Doing better things” Reformative | <ul style="list-style-type: none"> • Green and responsible products • Renewable energy • Circular economy • Dematerialisation |
| Third order change <i>Epistemic learning</i> | “Seeing things differently” Transformative | <ul style="list-style-type: none"> • Subjective wellbeing • Seceding growth imperatives • Sustainable local economies |

Second-order change means reforming the existing production systems and consumption patterns. This is the phase underway in many societies and economies across the globe. Green and responsible products have been on the markets for some time, but their business significance is now rapidly growing due to consumer demands and increasing transparency of production chains. For many, this reformative approach is believed to be a final solution to the climate change challenge.

The three major reformative changes with regard to production systems are: a shift to renewable energy, building a circular economy and dematerialisation—the great promise of digitalisation. As discussed in section “[Need for a Paradigm Change](#)”, even these reformations do not guarantee that we will be able to reach absolute decoupling of material consumption and greenhouse gas emissions from economic growth.

The big question for learning and change is if they have to be truly transformative; able to fundamentally shift our worldview in order to save ourselves from the worst-case scenario of climate change. It is important to note, as Sterling (2010) explains, that “not only do current ways of thinking, perceiving and doing need to change in response to critical systemic conditions of uncertainty, complexity and unsustainability, but that old paradigms are the root of these conditions”.

Contemporary solutions to climate change based on our current worldview are not truly transformative but are only reformative. Constructing a sustainable future calls for changing our current way of living and consumer-based economic growth paradigm. It may be so that getting rid of this paradigm also challenges many other foundations of our current worldview. We may have to change our philosophical and scientific paradigms, to reposition our relation to nature, and perhaps most importantly, change our conception of the human mind.

Transforming Our Minds

There are several views on the possibility for the third-level learning described by Bateson (1972). Bateson himself considered it connecting to existential and spiritual experiences and thus being accessible only for few people. Sterling (2003), as many other authors, has taken a more pragmatic interpretation of the level three learning seeing it focusing on changing epistemic assumptions, but not necessarily requiring spiritual experiences involved.

However, examples of existential experiences are perhaps the most influential proofs of the capability of the human mind for third-order learning. According to Greyson (2015), several studies of people who have gone through a near death experienced (NDE) have yielded consistent findings showing changes in the experiencers' perception of self, relationship to others, and attitude toward life. These findings have even shown deepening effect as the time has elapsed from the experience.

Ring (1980) reported the following changes in existential understanding and worldviews related to NDE's:

greater appreciation for life, renewed sense of purpose, greater confidence and flexibility in coping with life's vicissitudes, increased value of love and service and decreased concern with personal status and material possessions, greater compassion for others, heightened sense of spiritual purpose, and a greatly reduced fear of death.

Another example comes from space exploration. In *The Fifth Discipline* (1990), Peter Senge quotes a story told by astronaut Rusty Schweickart who was one of the first humans able to look at the Earth from the space. In 1969, he flew test flights on Apollo 9. It took five years before he had words to express in public what he had experienced in space. That happened in 1974 in a gathering at Lindisfarne, a spiritual community on Long Island. According to Senge, Schweickart had realised that what he had experienced was not his story, but our story.

Schweickart had experienced, what he described as an extension of the sensory apparatus of the human species: “I was looking out from my eyes and feeling with my senses but it was also our eyes and our senses”. The story told by Schweickart is not a very long quotation in Senge’s book, but those words represent perhaps one of the most valuable and touching pieces of metaphysical knowledge recorded in human history. The following is a shortened version of the quote:

You look down there and you can’t imagine how many borders and boundaries you crossed again and again and again. And you don’t even see ‘em. At that wake-up scene – the Mideast – you know there are hundreds of people killing each other over some imaginary line that you can’t see. From where you see it, the thing is a whole, and it’s so beautiful. And you wish you could take one from each side in hand and say, ‘Look at it from this perspective. Look at that. What’s important?’

And so a little later on, your friend, again those same neighbours, the person next to you goes to the moon. And now he looks back and sees the Earth not as something big where he can see the beautiful details, but he sees the Earth as a small thing out there. And now that contrast between the bright blue and white Christmas tree ornament and that black sky, that infinite universe, really comes through.

The size of it, the significance of it – it becomes both things, it becomes so small and fragile, and such a precious little spot in the universe, that you can block it out with your thumb, and you realize that on that small spot, that little blue and white thing is everything that means anything to you. All of history and music, and poetry and art and war and death and birth and love, tears, joy, games, all of it is on that little spot out there that you can cover with your thumb.

And you realize that that perspective... that you’ve changed, that there’s something new there. That relationship is no longer what it was... Because now you’re no longer inside something with a window looking out at the picture, but now you’re out there and what you’ve got around your head is a goldfish bowl and there are no boundaries. There are no frames, there are no boundaries.

Pragmatic Approach to Transformative Learning

Rogers (1994) suggests that (transformative) learning process can involve the following dimensions (presented by Sterling (2010)):

- the *cognitive* dimension traditionally seen as the core of teaching, which involves the intellect
- the *affective* dimension, when emotions are connected with intellectual knowing
- the *existential* dimension where learners question their values and ways of living and start reconstructing their own sense of self
- the *empowerment* dimension involving a sense of responsibility, commitment and direction after the existential crisis has been resolved
- the *action* dimension, which, if the questions raised by the first four dimensions have been resolved, involves the development of informed choices at personal, social and political levels

Rogers's model describes the holistic nature of transformative learning which goes much deeper than traditional learning. It is important to note that the mind shift cannot be achieved without a certain amount of pain and resistance on behalf of the learner. Epistemic learning can be deeply uncomfortable, because it involves a restructuring of basic assumptions caused by the recognition of incoherence between assumptions and experience. On the other hand, this type of learning can also generate excitement (Sterling 2010).

An interesting question is if transformative learning for a sustainable future can take place without facing the feelings of pain or anxiety. Many authors of environmental education highlight the importance of optimistic and solution-based approaches, which is certainly important when educating young people. However, it is important to note that there is a great difference between changing the mind of a young person versus an adult as Gardner (2006) has pointed out. Young people do not have a deeply fixed worldview while adults have to be exposed to the emotional dissonance between new ways of thinking and their current worldview, values, beliefs and theories before transformative learning can take place.

Another way to initiate transformative learning is to understand it as a process of unlearning. At the moment, there does not exist any substantial models or theories for unlearning. However, the elementary components of unlearning have been recognised by many scholars. Unlearning is not about reframing or reconstructing our current thinking but moving away from our existing mental structures towards a position which enables a fundamentally different way of seeing the world.

The essence of unlearning is a journey to ourselves. Instead of reflecting and then criticising our current thinking, we should empty our minds to reach an openness to learning. This stage enables us to create new associations and thinking which is not locked in our current thinking and paradigm. In short, the question is about a spiritual dimension of learning.

Unlearning has to do with intuition. It is a journey from our conscious mind to the unconscious level. The conscious level, on which we usually learn and operate, equals the visible tip of the iceberg and cognitive order of learning. Reflecting our mental models beneath the sea surface (meta-cognitive learning) is a process that is partly conscious, but can benefit a great deal from the contribution of the unconscious mind. Epistemic (transformative) learning is about seeing the sea, our worldview, from a reflective perspective. It can be questioned how well we can do this from our conscious level of thinking. Stepping out of our mental box requires a fundamental shift of viewpoint, unlearning and innovative or intuitive construction of a new worldview.

As we take an organisational or cultural approach to transformative learning, we are essentially creating shared worldviews. This is important from the viewpoint of intuition. The research and theories around intuition arouse interesting possibilities for extending consciousness on transpersonal level. This could lead us to a possibility of shared understanding of the fundamentals of our common life, as well as emergence of a new community, collaboration and planetary responsibility. (Read more about intuition in the chapter by Asta Raami.)

Sense of Coherence

One of the strongest leverage points for mind shift lies in the theory of *Sense of Coherence*, which defines subjective wellbeing comprising of the complexity, manageability and meaningfulness of life (Hämäläinen 2014). This theory is especially applicable for explaining the origin of mental health disorders the western world is currently facing. Our consumerist society, rapidly advancing technologies and recurring global crisis have created a living environment in which our sense of coherence is constantly deteriorating.

Despite having more capabilities, choice and freedoms than ever before, large parts of the population in high-income countries experience extended feelings of stress and fatigue, and depression and related mental health problems have become common and widespread (Hämäläinen 2014; Weehuizen 2005). This is a product of the complex world around us and life manageability problems due to our busy lives filled with often superfluous choices. Our modern society is also suffering from a vanishing understanding of what makes life meaningful to which the consumer-centred wellbeing paradigm has been unable to provide a solution.

It seems that we are as much locked in our current way of living on the individual level as we are locked in our prevailing economic paradigm on the society level. Understanding the significance of the three elements of coherence in our lives could open new kinds of possibilities for improving subjective wellbeing in society. Turning our awareness to the inside of our minds can bring us a stronger understanding and sense of the deeper meanings and factors that create true happiness. This kind of illumination could be a way to brake the chains of complexity and manageability restraining our ability to achieve greater wellbeing.

A great hope for a sustainable future lies in the fact that modern research on wellbeing brings strong evidence that the building blocks for meaningfulness and true happiness are mostly in other issues than consumerism and material things. Meaningful and happy life consists of social relationships, encounters with other people, time spent with a family, voluntary work and acting for other people, creative activities, etc. (Salonen and Konkka 2015) *In practice, these findings suggest that we are able to achieve a greater state of life satisfaction and happiness in a society that does not base its health on the continued growth of the economy and consumption.*

Without a doubt, the emergence of new ways of living cannot be promoted only by improving the consciousness of people. It is also important to provide opportunities by which people can experience the benefits themselves and truly investigate in an intuitive way what really matters to them. We need more examples that show that these better ways of living are feasible now.

ELEMENTS OF TRANSFORMATIVE LEARNING FOR A SUSTAINABLE FUTURE

Transformative learning for a sustainable future is defined as

Learning that transforms our existential understanding and conceptions about the interdependence of humans and nature, the essence of humanity, fundamentals of wellbeing, and the role of economy in our world and daily lives. It aims at developing a holistic world-view and deep realisation and coherence of the purpose, direction, values, choices and actions of one's life. It accumulates into an emergence of learning communities and ecosystems demonstrating new, resilient sustainable lifestyles, which finally lead to a cultural transformation into a sustainable society and the world.

Changing the Focus of Learning

What would an integrative perspective of transformative learning for a sustainable future look like? (See Fig. 5.4.) The centre of knowledge content is not subjects or sciences, but the wholeness of our world and our lives. Learning focuses around understanding the connections between humans, nature, society and the economy with an aim to develop solutions for our sustainability challenges and making a sustainable world real while learning. Learners' own life experiences have to become part of the learning substance, and participation in change processes within society must become part of learning.

In a rapidly changing world, the role of the curriculum must also be reconsidered. Instead of its common use as a collection of often outdated knowledge, it should be a tool for organising learning opportunities in which education, learning and the latest scientific knowledge converge around making real-life changes in the environment and society. The knowledge content and sustainability issues are handled using a set of future-oriented skills. These skills involve cognitive skills such as systems thinking, critical thinking, and future thinking, which are suggested being the key thinking skills of education for sustainable development (e.g. Tilbury and Cooke 2005). In addition, communication and interpersonal skills are vital in creating common solutions. The skills of

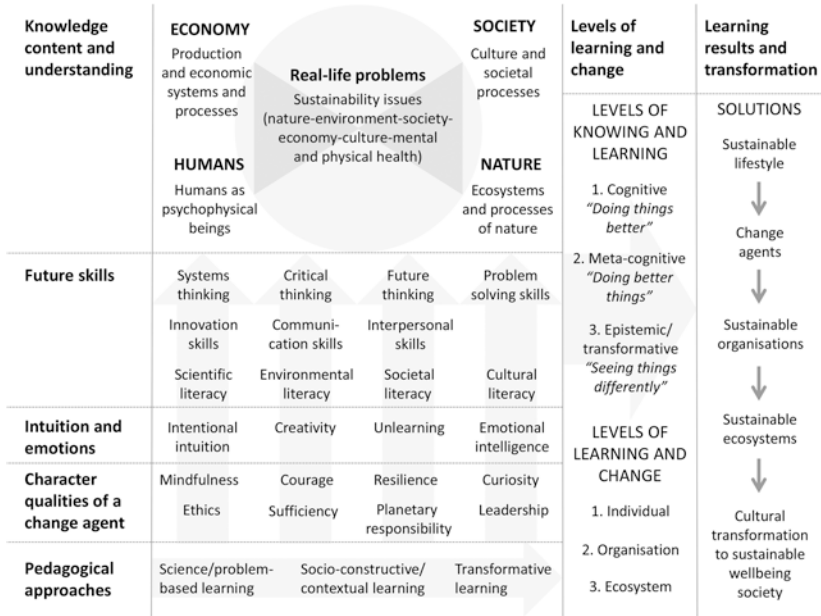


Fig. 5.4 An integrative perspective of transformative learning for a sustainable future

literature are seen as a multi-dimensional ability to perceive, interpret and understand the environment, society and culture.

The Intrinsic Dimension of Learning

The cognitive competences can be seen as tools by which we can shape the clay of knowledge and create something new out of it. Our values and attitudes and conceptions behind them determine how we choose our clay and what we will shape from it. We can use our competences for the benefit of a sustainable future or support just the opposite development (our current mode). Therefore, education for a sustainable future must have a strong reflective value dimension included. This means utilising actively the second- and third-order learning described in section “On Board the Titanic” to critically reflect and evaluate our current societal values and assumptions as well as fundamentals of our shared Western worldview.

Learning for a sustainable future is an all-encompassing process. It is a mistake to consider humans as rationally behaving subjects that will take action once they have been introduced to the facts about an issue. If we only focus on the power of teaching knowledge and cognitive and practical skills, there is a danger we will miss the most important point: what generates the motivation for real, transformative actions?

People make choices and take actions based on their intrinsic values and the things that they consider important. This will be of course disturbed frequently by the environment, and many times the choices we make are based on external factors such as acceptance or admiration of other people. Therefore, one of the most important skills of learning for a sustainable future is learning to know oneself. What is truly important for me, what makes me happy, what is a good life for me?

Values, especially those that concern defining a meaningful life, cannot be taught directly. Instead, learners should be provided experiences that touch their emotions—and lead them to the springs of their intrinsic values. Therefore, versatile real learning environments (nature, cultural environments, social encounters, etc.) as well as the arts are crucial elements of education for a sustainable future.

The unconscious mind should be fostered intentionally as a source of creativity, complex problem-solving and holistic thinking. Knowing, interpreting and understanding the emotions of one's own and those of others must be seen as important as developing rational skills; rationality and empathy are brought into balance. Intuition and unlearning skills which can unleash our creativity are crucial parts of the toolbox for transformative learning.

Fostering Change Agency

Encouraging individuals to adopt a sustainable lifestyle is not a sufficient target for transformative learning for a sustainable future. We must foster individuals that can generate change in the different roles or phases of their lives. Fadel et al. (2015) regard the *character dimension* as a central building block for the future of education. They state that, “character education is about the acquisition and strengthening of virtues (qualities), values (beliefs and ideals), and the capacity to make wise choices for a well-rounded life and a thriving society”. The six character qualities listed by Fadel et al. encompass mindfulness, curiosity, courage,

resilience, ethics and leadership. These characteristics play a central role in becoming a change agent for a sustainable future.

Mindfulness is a key to alignment of one's message and personal example: Change agents with good mindfulness abilities live their visions and are able to communicate convincingly. A mindfulness ability is also important for critical reflection of one's own behaviour and changing one's actions when needed. Mindfulness helps one concentrating fully on the present moment and listening one's inner thoughts. Thus, it is a key to intuitive thinking and unlearning.

A change agent needs *courage* to be able to cope with uncertainty and stress caused by contradictory beliefs and attitudes towards sustainability issues. A true change agent has courage to speak aloud about the insanity of our current lifestyles and the direction we are heading. Too many of us remain silent although we are feeling that this is not the way we should go. *Resilience* can be seen as internal strength helping a person proceed towards her goal despite external factors that may deteriorate progress.

The task of a change agent for a sustainable future is not to offer a ready solution (like a religion) to her audience. It is most important to awake and inspire people to start thinking critically, participating and acting to construct a sustainable future. In this process, a change agent is not a prophet but a co-explorer. *Curiosity* helps a change agent to get other people involved and inspired in actions and innovations for a sustainable future.

Ethics is a characteristic which is strongly linked with the aspiration of a sustainable future. Change agents can also lack ethical dimension in their action, e.g. if their goal is to promote certain selfish or narrow political interests. A true change agent for a sustainable future has to possess a great amount of ethical wisdom to use her power for the benefit of all people and the planet.

Every change agent is a leader, in a wider or a smaller context. Therefore, *leadership* is a key characteristic of a change agent. According to Fadel et al. (2015), twenty-first century leadership is about facilitating and inspiring others to pursue together the collective targets of an organisation. This kind of leadership is adaptable on a wide scale from big organisations to small communities. Therefore, developing the characteristic of future leadership is not only for those who are aiming at leadership positions in working life. Instead, it is something everyone should practice and learn.

Salonen and Bardy (2015) list two additional important character qualities for a change agent in their eco-social approach to learning: *sufficiency* as a character quality to satisfy oneself with less material welfare, and *responsibility* as a character quality encompassing sharing and caring and planetary responsibility over the human and non-human world.

Transformative Learning at the Organisational Level

In order to achieve the transformation of society, it is also important to widen the scope of learning to organisational and societal scales. There are several important viewpoints to consider when developing a school or organisational culture and learning environments that support transformative learning for a sustainable future (Fig. 5.5).

A school must act as it teaches. The school culture must reflect different aspects of sustainability and enable students to learn the skills necessary for a sustainable lifestyle as part of their everyday school life. A good and safe learning environment and caring atmosphere is the starting point for all learning. It is essential that schools foster students' understanding of subjective wellbeing and aspire to create a learning environment that supports sense of coherence (see section "[On Board the Titanic](#)").

A school must engage all students as well as staff in a common process of learning and development toward creating a sustainable school. This is essential for internalising the skills needed for becoming a change agent. School culture must provide experiences that evoke emotions and support the origin of intrinsic values, meaningfulness and the development of worldviews and existential understanding. Students' genuine participation and influence on common issues must take place inside and outside of the school. These experiences should be linked to value generation with a target of empowering change agents for a sustainable future.

The most fundamental characteristic of school culture supporting transformative learning is that the school must operate itself as an active participant in the cultural transformation towards a sustainable future. This means, among other things, an active use of external learning environments, cooperation and networking with other organisations in the society and even international context, linking formal and informal learning, active participation in the change processes of society, and linking students' learning in these processes.

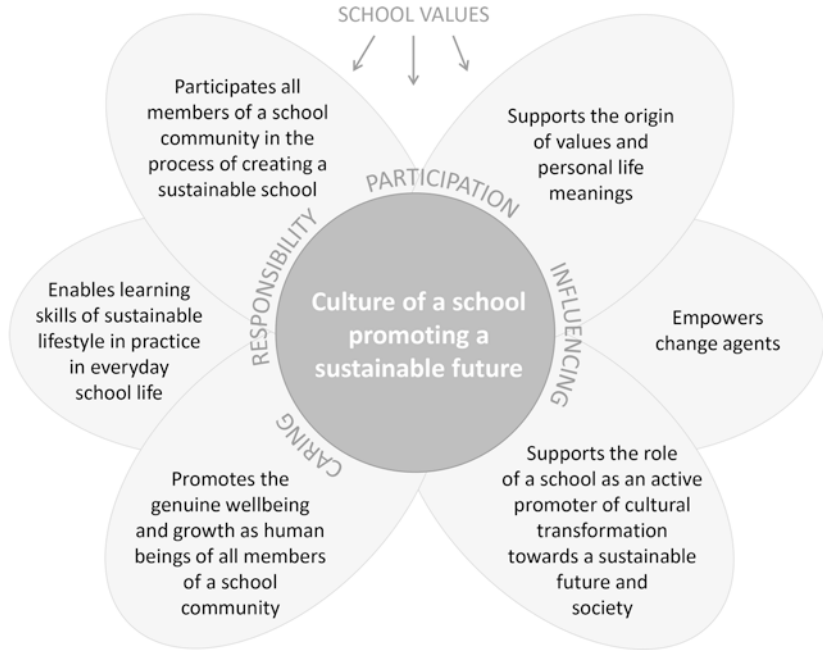


Fig. 5.5 Culture of a school promoting a sustainable future (OKKA-säätiö 2013)

VISION OF THE FUTURE SCHOOL

Can We Change Schools?

Our contemporary education system has a grand challenge with regard to enabling the transformative learning of individuals and societies. As Peter Senge et al. (2012) explains, our schools are products of the industrial era which manifests itself in the structures and power relations of educational organisations as well as targets, subjects and contents of learning. In other words, they reflect deeply our Western worldview which is the underlying cause for the sustainability crisis. School systems throughout the world are currently also in deep crisis because they are not able to respond to the requirements of rapidly changing world of interconnectedness, complexity and unsustainability.

In *The Fifth Discipline* (1990) and *Schools That Learn* (2012), Peter Senge writes about *systems citizenship*. By this, Senge refers to the ability to understand interdependencies in our world and to find solutions to complex sustainability issues. Senge sees an enormous potential for change in our youngest generation. Children of today seem to be open for understanding future problems from a holistic perspective. They are also ready to take together responsibility for their (and our) common future if they were given a chance.

Senge et al. (2012) describes the task of education as “not to create the best of yesterday’s cultures, but to foster the interrelated culture of tomorrow”. To be able to do this, we must find a meaningful consensus of the scope and substance of education for the twenty-first century. According to Senge et al., innovation is difficult, because we tend to always return the only educational goals people know: basic skills in math, science, and literature and ultimately better test scores.

Senge et al. writes with great optimism for changing the purpose of education into a vehicle for shifting societies towards sustainability. However, the problem of the education system is maybe not in teaching future competencies, but in the worldview that fixes the values, contents, goals and methods of education. These are perhaps one of the greatest means of power and continuity in our societies. What politician would give up this power and hand it to the next generation? Therefore, the implicit target of education is to convey the existing societal worldview and value system to the next generation so that they can become “good citizens” and stewards of the system.

Another important question is, can we ever reach a fundamental shift in the purpose, goals and main contents of education by a reformist approach. Even the best attempts will easily decay as diluted compromises under the pressure and interests of politicians and experts from different arenas. Schools also tend to have a conservative organisational culture, which maintains the existing status quo.

It may well be that the school system is a prisoner of its history which derives from the worldview of the industrial age and scientific reductionism. The world, society and power relations should first change before education system can do so. And even if there would be change, it is slow and gradual and not at all at a scale that would be needed to solve escalating future problems.

A Radical Vision of the Future School

I dare to offer a vision how we could see the future of education in a radical and totally different way. What if the future school would not convey our existing worldview anymore? Let us forget the familiar school subjects, curricula and the philosophies, scientific traditions and political interests behind them. The future school would be based on a strong faith in the wisdom of our youngest generation. It would provide complete liberation to its students to create the world they want—even if it would mean for us adults giving up our current ways of living.

The main goal of education would be to give future generations tools for thinking and seeing the world differently, constructing their own worldviews, and acting to create a sustainable future. Learning would be embedded in creating change. Schools would be living learning organisations (or rather communities) which were shaped by the learners. Schools would no longer be physical spaces for learning. Instead of people coming to school, learning would go where people are. This can mean for example, establishing local learning circles based on face-to-face learning but also digital learning communities even at global scale.

The central idea would be to create learning communities where people learn and make a sustainable future real together. These communities would emerge self-directed around the problems and interests of learners. The future school would be for everyone, young and adult learners. They could learn together or with their peers, depending on the scope of learning and questions involved. Table 5.4 illustrates the core ideas of this vision.

The living learning communities would establish binds between each other based on common interests and targets, and form ecosystems of change. The ultimate goal of networking would be a global ecosystem of communities with the collective aspiration for a sustainable future while creating cultural transformation in societies and the world. The learners would create a web of change that led to exceeding the critical mass required for societal transformation. This would challenge the dominant institutions and systems of society.

The future school is about revolutionary learning. The solution for a sustainable world can be found in the intuitive capacity of the human mind, which we cannot utilise with conventional methods of thinking

Table 5.4 Vision of the future school

| <i>Core of the vision: the future school</i> | |
|--|--|
| Structure | <ul style="list-style-type: none"> • is not a physical place, but is everywhere, takes learning to communities and networks and to interaction between people • has no hierarchical management, learning is supported by coordinators linking learners and facilitating their learning • does not classify learners based on their level, age and achievements • has no curriculum with subject-based learning goals and contents • is based on self-organisation, links people with learning communities and other people sharing the same questions and themes of interest • integrates learners and change makers to experts in different fields of inquiry |
| Purpose | <ul style="list-style-type: none"> • creates deeper meaningfulness, purpose of life and community for learners • makes learning and skills shared and accumulates individual learning into learning and change of communities, ecosystems and global society • acts as a change agent and accumulator of critical mass for societal transformation • challenges institutions and politics • turns global hyper-connectedness from a threat to opportunity by combining the collective wisdom of humankind |
| Ethos | <ul style="list-style-type: none"> • aims at creating a deep understanding of the essence of life and humanity • is committed to breaking the boundaries of thinking and knowledge, and to learning that transforms the fundamentals of life, being and worldviews • does not acknowledge subject or science boundaries, but looks at the world and phenomena from a holistic perspective |
| Learning goals | <ul style="list-style-type: none"> • sets aspiration of good life, realising individual and common dreams, reaching the full potential of a human being, and creation of a new, sustainable world as the main goals for learning • tackles the complex challenges of the future on the local and global level and seeks solutions for them |
| Methodology | <ul style="list-style-type: none"> • aims at synthesising of knowledge and understanding deeper meanings • focuses on developing human character qualities (e.g. courage, mindfulness, curiosity, resilience, ethics, leadership, sufficiency, planetary responsibility) • fosters and utilises the skills of change making (systems thinking, critical thinking, future thinking, creativity and innovation, interpersonal skills, emotional intelligence, scientific, environmental, social and cultural literacy) • feeds courage, experiments and demonstration of new solutions |

(continued)

Table 5.4 (continued)

| <i>Core of the vision: the future school</i> | |
|--|---|
| Revolutionary learning | <ul style="list-style-type: none"> • has the aspiration to question things and seek solutions outside the prevailing thinking patterns and paradigms • revolutionises the concepts of knowledge, learning, humanity and life, and takes intuition as integral part of learning • has a target of achieving fundamental transformation in worldviews, thinking, actions and behaviour of people, organisations, communities and societies • aims at educating individuals as change agents |

and learning. This potential must be unleashed on the individual level and be networked on the community and global levels. Intuitive knowing can bring forth the best of us and show that in the end goodness is the deepest part of humanity. We can create shared wisdom that will save our planet from eco-disaster and lead to a renaissance of humanity over the supremacy of technology.

This form of future school challenges the existing formal system from every side. It is not dependent on politics, norms or structures. It does not ask permission from the society and it is not accountable to the public system. Its origin evolves from the crisis of the world, societies and education systems. It challenges them by providing solutions for the problems that our current systems cannot solve. Its status is not based on formal competencies, evaluations and grades. The future world, its societies and organisations will not need professional titles, but deeper understanding, skills and change makers.

The future school links its learners to other learners and communities within society. The learners will prove their competence directly by acting together with other people and creating change as they learn. They will be recruited to future labour markets straight from their learning networks, as it is easy to imagine that at some point in the future, degrees will lose their significance. This is a radical and un-authoritarian vision of education. I believe this can happen if the current formal education system cannot make a fundamental change. If the change will not take place inside the system, the challengers will come from outside.

CULTURAL TRANSFORMATION

The World Has Stringent Tuning

Our current world has a stringent tuning in many ways. We are living in an interconnected global society with a rapid flow of information, capital and people. Into our financial system are embedded expectations which cannot be met without constantly rising profits. Demands for increasing efficiency and productivity are strangling a work-life balance. At the same time, we are also taking significant risks with regard to accelerating environmental problems. In a world of scarce resources, inequality, political crisis and wars seem to be unavoidable.

This stringent tuning together with interconnectedness makes our societies and global system vulnerable to disturbances and crisis. Resilience is a term related to ability of an organism or a society to cope with external stress and maintain its ability to operate. Resilience is put under pressure in crisis situations, but it also seems that resilience is sought from “putting more steam” into the system to maintain its stability, an example of this being the measures taken by central banks to medicate the financial crisis. The side effect is that this strategy increases tension in the system and makes it even more vulnerable to disturbances.

We find ourselves currently with only one unsecure societal paradigm, which creates an unbearable risk for global ecosystems and the existence of humankind. Having no alternatives for this paradigm is not a precautionary and resilient policy. The latest scientific understanding suggests sharply changing the relationship between humans and nature as well as finding less destructive means for seeking wellbeing. In practice, this probably requires relinquishing growth imperative and releasing the tension in our global system. How can we do that if there is a great risk of a sudden economic collapse and a resultant human disaster if we begin to remove steam from the machine?

A solution could be found in planning alternative futures. An ideal way to do this would be to adopt policies for exploring and testing alternative solutions for how to organise society and collect learnings that could be adopted from these experiments. The idea would be to avoid collapse by establishing “for the other foot” a solid ground on which we could safely step. A problem with this approach is the fixed paradigm of institutions, corporations and decision makers. In a desperate search for short-term remedies and quick solutions, it is not very likely that this kind of policy would be supported.

A more realistic approach for creating alternative futures is a bottom-up strategy (Fig. 5.6). A cultural transformation for a sustainable future can emerge from individuals and communities developing new solutions, such as organising local economies, improving subjective wellbeing, and creating meaningful interaction between people. These communities can become self-sufficient and demonstrate real resilience against complex future problems. A key for cultural transformation is learning, sharing and disseminating these experiments and building ecosystems of communities with new worldviews, purposes, values and behaviour patterns.

This perspective provides interesting possibilities for educational organisations. Sterling (2003) has developed a model of “ecology of education systems” in which education system, educational institutions and environmental education are represented as sub-systems of the society. The challenge of education, as Sterling puts it, is that “education is

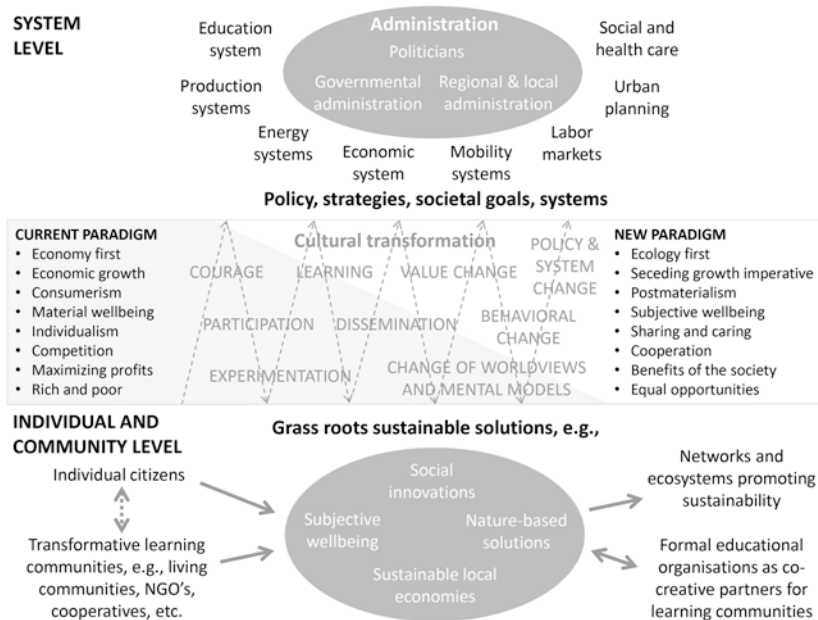


Fig. 5.6 A bottom-up strategy for creating alternative futures and establishing cultural transformation

seen as a means of effecting change in the social and cultural context—and yet it is the same context which has overwhelmingly prescribed the role of education as socialisation and maintenance, rather than transformation”.

Sterling sees systems thinking as a partial solution to this dilemma: educational institutions should transform in co-creative learning process together with society. Could the above-mentioned emerging learning communities be co-creative partners for formal educational institutions? This would enable students to become co-learners in creating a sustainable society. This would also make educational institutions active agents in the societal change. The process would create a reinforcing loop where education changes society which will again have an impact on the design of education system.

Perhaps the future of transformative education will become poly-morphic. Formal education system may find a co-creative transformative relationship with society, and radical modern learning organisations (as described in section “[A Radical Vision of the Future School](#)”) may emerge from side to amplify transformation, entering their influence in all sectors of society. In society the cultural transformation is based on a constant interaction between the individual, organisational and system levels. At some point, the bottom-up demands will become so strong that the system is forced to change.

Searching for Direction

It is important to note that we cannot know in advance what a sustainable future will look like. We have only good science-based descriptions on the features of a society that can be sustainable. In developing alternative futures, it is wise to use this scientific knowledge to understand the relationships between economy, wellbeing and ecological sustainability. This can give us a direction from which we can search for possible solutions.

Max-Neef (2010) states five postulates for a, new sustainable economy:

1. The economy is to serve the people, and not the people to serve the economy.
2. Development is about people and not about objects.

3. Growth is not the same as development, and development does not necessarily require growth.
4. No economy is possible in the absence of eco-system services.
5. The economy is a sub-system of a larger and finite system, the biosphere, hence permanent growth is impossible.

Max-Neef points out that “the most important contribution of a human scale economy is that it may allow for the transition from a paradigm based on greed, competition, and accumulation, to one based on solidarity, cooperation, and compassion”. He suggests that new economic models must accept the limits of the carrying capacity of the Earth, move from efficiency to sufficiency and qualitative wellbeing, and solve the present economic imbalances and inequities. Transition must be towards societies that can adjust to a reduced level of production and consumption, and favouring localised systems of economic organisation.

Post-materialism can provide a possibility to safeguard ecological sustainability and at the same time to improve subjective wellbeing of people. The Eco-Social approach (Table 5.5) represents a model based on a post-materialistic view. Shift from a materialistic paradigm to post-materialism would require reassessment of the role of the economy: it would no longer be the ultimate goal by itself but is a means for improving subjective wellbeing based on the true needs of human beings. This could possibly lead to an abandonment of the sacrosanct necessity of economic growth and the introduction of an alternative economic system focusing on the subjective quality of life.

Table 5.5 Differences between the popular view and the proposed Ecosocial Approach to Well-being (adapted from Salonen and Konkka 2015)

| | <i>Popular view</i> | <i>Ecosocial Approach to Well-being</i> |
|-----------|---|---|
| Good life | material consumption, individualism, needs of our generation | non-material consumption, sharing and caring, needs of future generations |
| Economy | competition, “more”, maximizing of owner’s profits, rich and poor | cooperation, “better”, benefits to society, equality of opportunity |
| Time | short-termism, intra-generational equity | long-term orientation, intra-generational and inter-generational equity |

The journey to the future is about unlearning our current worldview and learning a new sustainable one to replace it. This learning is truly transformative.

CONCLUSIONS

Green growth is the current economic and societal paradigm inside which we are searching for sustainable global solutions for our common future. However, our chances to succeed in solving environmental and social problems while staying on economic growth path seem to be questionable. Mankind is taking a substantial risk of disaster if we do not have any alternative plans for the economic growth model in the form we currently understand it. It seems that the reason behind this unintellectual strategy is our deeply anchored Western worldview which derives from atomistic and reductionist thinking, mechanistic industrial age societal and economic models as well as a materialistic conception of wellbeing.

In front of the threat of climate change and other complex sustainability problems, reformist changes in our economy, production and energy systems and consumption patterns can turn out to be inadequate. From the viewpoint of learning, reformist improvements are the best we can achieve by cognitive and meta-cognitive thinking. Changing our worldview requires third-order transformative (epistemic) learning which requires critical reflection between assumptions and experience and reconstructing one's own sense of self.

Transformative learning is about seeing our worldview from a reflective perspective. It can be questioned how well we can ever do this on our conscious level of thinking. Stepping out from our mental box and transforming our thinking requires a fundamental shift of viewpoint, unlearning and constructing a new worldview. Intuition can help us to unlearn our prevailing worldviews and assumptions and to create innovative new solutions. It is also a key for seeing the world from a holistic perspective, by our *common eyes* instead of one's own eyes.

A strong leverage point for mind shift lies in the theory of *Sense of Coherence*, which defines subjective wellbeing comprising the complexity, manageability and meaningfulness of life. This theory is especially applicable for explaining the origin of mental health disorders the Western world is currently facing.

Consumerist society, rapidly advancing technologies and recurring crisis of our world have created a living environment in which mental

and life management problems have become commonplace. Modern society is also suffering from vanishing meaningfulness of life to which the consumer-centred wellbeing paradigm has not been able to provide a solution.

Modern wellbeing research suggests hope for a sustainable future. It provides strong evidence of the fact that the building blocks for meaningfulness and true happiness are mostly factors other than consumerism and material things. True happiness and meaningful life consists of social relationships, encounters with other people, time spent with family, voluntary work and acts in the interests of other people, creative activities, etc. In practice, these findings suggest that we are able to achieve a greater state of life satisfaction and happiness in a society that is not based on the continuing growth of the economy and personal consumption.

In the future school, transformative learning for a sustainable future should be the core mission of education. Learning should be focused on understanding the connections between humans, nature, society and economy. This requires moving from subject-based orientation towards solving real-life problems with future skills like systems thinking, critical thinking, future thinking and interpersonal skills. Other than cognitive skills, the unconscious mind must be utilised intentionally as a source of creativity, empathy, complex problem-solving and holistic thinking. Character education with qualities such as mindfulness, curiosity, courage, resilience, ethics, leadership, sufficiency and planetary responsibility are an integral part of fostering change agents for a sustainable future.

In order to achieve large-scale transformation, it is important to widen the scope of learning to organisational and societal levels. School must include all students as well as the staff in a common learning and development process of creating a sustainable school. School culture must provide experiences that provoke an emotional response and support the origin of intrinsic values, meaningfulness and the development of new worldviews built on existential understanding. Students' genuine participation and influence on common issues must take place inside and outside of the school.

Reforms to the education system may still not be enough to achieve transformative learning. The problem of our education systems may not be in teaching future competencies, but in the prevailing worldview of our society that fixes the values, contents, goals and methods of education. Thus, the implicit target of education is to convey this worldview

and our value system to the next generation so that they can become “good citizens” and stewards of the system.

It may be that our education system is a prisoner of its history which derives from the worldview of the industrial age and scientific reductionism. The world, society and power relations may need to change first before education system can do so. And even if there would be change, it is slow and gradual and not at all on a scale that would be needed to respond to escalating future crises.

Thus, a revolutionary approach that challenges the contemporary education system from every side may be needed to achieve true transformative learning. A vision for the future of school is based on a strong faith in the wisdom of our youngest generation. It would give complete liberation to its students to create the world they want—even if it would mean for us adults giving up our current ways of living.

The future school would give coming generations tools for thinking and seeing the world differently, constructing their own worldviews and acting to create a sustainable future. However, it would be open to everyone and learners of all ages. Schools would be self-organised living learning communities which were shaped by the learners. These communities would unite people and experts from different fields of inquiry to learn and make a sustainable future together.

The aim of these future learning communities would be to create deep meaningfulness, purpose and community for learners and act as active change agents. In the very heart of these communities is aspiration for a deep understanding of the essence of life and humanity. They are committed to breaking the boundaries of thinking and knowledge, and to learning that transforms the fundamentals of life, existence and worldviews. They unleash intuitive knowledge and combine the intuitive potential of individuals.

The living learning communities would establish binds between each other based on common interests and targets, and form ecosystems of change. The ultimate goal of networking would be a global ecosystem of communities with aspirations for a sustainable future through creating cultural transformation in society. The learners would create a web of change that formed the critical mass required for societal transformation. This would challenge the dominant institutions and systems of society.

Even the most visionary future learning community cannot make a cultural transformation happen in a blink of an eye. One challenge to rapid change is the stringent tuning of our world which is related to interconnectedness and rapid flow of information, capital and people.

Keeping the financial pyramid standing requires ever-increasing profits. It seems that the only way to keep our global system on a track is to constantly increase its volume. But how can we change if there is a great risk of a sudden economic collapse or human disaster if we tinker with the machine?

A solution may be found in planning alternative futures. With only one unsecure paradigm for the global economic system, how can we explore and test a precautionary approach and necessities such as resilience? An ideal way to do this would be to adopt societal and global experimental policies for alternative solutions to organising society. The idea would be to avoid collapse by establishing “for the other foot” a solid ground on which it could safely step. A problem with this approach is the fixed paradigm of institutions, businesses and decision-makers. In a desperate search for short-term remedies and quick solutions, it is not very likely that this kind of policy would be supported.

A more realistic approach for creating alternative futures is bottom-up strategy. A cultural transformation for a sustainable future can emerge from individuals and communities developing new solutions such as organising local economies, improving subjective wellbeing and creating meaningful interaction between people. These communities can become self-sufficient and demonstrate real resilience against complex future problems. A key for cultural transformation is learning, sharing and disseminating these experiments and building ecosystems of communities with new worldviews, purposes, values and behaviour patterns.

This perspective provides interesting possibilities for educational organisations. The above-mentioned emerging learning communities can be co-creative partners for formal educational institutions. This would enable students to become co-learners in creating a sustainable society. This would also make educational institutions active agents in societal change. The process would create a reinforcing loop where education changes society which will again have an impact on the design of education system.

Perhaps the future of transformative education will become polymorphic. Formal education system may find a co-creative transformative relationship with society, and radical modern learning organisations may emerge from side to amplify transformation, entering their influence in all sectors of society.

The cultural transformation is based on constant interaction between the individual, organisational and system levels. At some point, the bottom-up demands will become so strong that the system is forced to change.

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CHAPTER 6

Towards Solving the Impossible Problems

Asta Raami

INTRODUCTION

In our world and personal lives, there is a growing need for coherence and resilience. Growing uncertainty and multiplying, paradoxical choices create dissonance, stress and incoherence both in terms of individual and environmental wellbeing. Correspondingly, sustainable choices improve coherence of natural and social systems. Achieving internal and external coherence and sustainable behaviour is above all a decision-making challenge. Coherent decision-making is seen as the key to sustainable wellbeing at all levels of society (Hämäläinen 2014).

But how can we make better decisions? Complex problem solving is not easy in the best of circumstances, and increasing complexity of today's problems causes difficulty when trying to foresee or predict the full effects of one's decisions. Living amid uncertainty and still being able to make decisions in confrontational situations requires various internal competencies. For example, resilience, foresight, systemic intelligence, willpower, self-regulation and emotion control are important. Further, intra- and inter-personal attunement as well as compassion and empathy are essential skills.

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However, the main barrier to better problem-solving is often the human brain, due to its limited capacity to problem solve in certain conditions. Recent research opens up new perspectives on the human mind, the possibilities of knowing as well as the personal capacities necessary to creating, discovering and inventing. In this chapter, I explore these issues from the perspective of internal knowing, or intuition. We will start with a closer analysis of problem solving and ways of knowing.

WICKED PROBLEMS AND COLLAPSING TIME FRAMES

Problems are usually divided into three major categories: well-defined problems, ill-defined problems, and *wicked* problems (Rittel and Webber 1973). The most challenging type of problem is a wicked problem. This type of problem cannot be exhaustively formulated, hence, there are many explanations for the same problem and every formulation is in some way a statement of a solution. The solving process is infinite—every problem is a symptom of another problem, and every solution usually leads to a new problem. It is difficult to know what components of a problem are relevant and what information will be useful until a solution is attempted (Lawson 1997). Every wicked problem is unique, so neither previous experience is particularly instructive nor can a list of previously successful operations be utilized. In many situations, like climate change, the problem is urgent, there is a need for immediate action, and problem solvers have little space to be wrong (Rittel and Webber 1973) (Fig. 6.1).

Every wicked problem has a structure of its own. Tame and *wicked* problems are not governed by the same logics. The strategies developed to combat tame problems are not just different in degree, but above all are different *in kind* from wicked problems, which have a complexity, ambiguity and epistemological uniqueness of their own (Nelson and Stolterman 2003). In addition, there is no single correct approach or methodology for finding, defining or solving wicked problems. In an effort to solve one part of the problem, the whole setting transforms and new problems arise, often more challenging in nature because they are an underlying issue producing superficial symptoms.

With wicked problems, an attempt to intervene in it is generally a better option than doing nothing at all. In an uncertain world, forethought combined with quick reaction—being prepared and ready—is thought to

| PROBLEM TYPE | CHARACTERISTICS | SOLUTIONS |
|------------------------------|---|---|
| WELL-DEFINED PROBLEMS | Goals known Constraints known Solutions known Success criteria known Optimal solution | The solution can be optimized |
| ILL-DEFINED PROBLEMS | Problem? Solution? Success Criteria? Multiple solutions | Solutions cannot be optimized but can be satisfactory |
| WICKED PROBLEMS | Incomplete, no formula Contradictory Changing Definition No stop rule Unique, no cases Solution >> a new problem Unknown/No optimal solutions | Solutions can be at most actionable |

Fig. 6.1 Well defined, Ill-defined and wicked problems. Illustration inspired by Rittel and Webber (1973)

be beneficial. This is because behind many errors is the inability to anticipate. Often, a transformative change has not been seen or recognized even though it has unfolded in front of our eyes. How could we better foresee, or consciously notice those changes that demand action? And what kind of action should we take?

Humankind is facing a full spectrum of wicked problems and the window of opportunity for solving some of them appears to be closing. It is not easy to recognize that the prevailing scientific paradigm predefines future problem spaces, which then narrows possible future solutions. In other words, we tend to start considering solutions based on what we already know to exist, or is deemed possible. *We are thus prone to ignore potentials we consider impossible.* However, many problems have been considered impossible—until they are solved.

To search for radical breakthrough innovations, with extreme novelty, searching beyond the current paradigm is crucial. To be able to solve wicked problems, we must find ways to surpass the limits of the known; rational and analytical thinking is not enough.

In complex problem solving, the analytical mind can be overcome by too many options. It struggles when there is a lack of information or when it cannot push beyond imagination to envision entirely new options. A person is often not even aware of a lack of information or what could be known. In the worst case, there is simultaneously an overload and a lack of information, compounded by critical time limits for making decisions. But evidence and history suggest that when faced with such constraints, intuitive faculties can operate with greater accuracy than conscious reasoning. (Dijksterhuis et al. 2006; Frank et al. 2006; Gigerenzer 2007; Klein 1998).

Most wicked problems are entangled knots with countless variables. Further, while the world continues to change ever more rapidly, everyone, especially students need to be prepared to handle the future's as yet unknown configurations (Marton 2014).

Even though technological development is important and transformative in terms of its impact on society, it is not enough. Implementing new technological solutions will not solve the problems humanity is facing. Technology is not even satisfactory when trying to predict changes waiting just beyond the horizon.

Philip Tetlock, a professor of psychology, has been researching political forecasting and prediction for more than 20 years. Tetlock states that predictions formulated by expert forecasters are not better than darts thrown at a board of possible futures. However, his research shows that some ordinary people do have real foresight. These people achieve 30% higher accuracy than *all* US intelligence services utilizing sophisticated intelligence gathering and analysis tools (Tetlock 2015). What makes

these ordinary people so insightful that they can be labelled ‘superforecasters’ by Tetlock?

The main principles are simple. They keep their minds open instead of implementing a certain style, method or viewpoint. They are curious, not limited by dogmas and collect information from diverse sources. With challenging issues, they split the phenomena into fractions that they can scrutinize, and then allow contradicting views to merge into a whole picture.

Superforecasters also pay careful attention to their internal knowing including untethered thoughts and feelings. They test everything since their most important ability is self-distance and learning from their mistakes. Further, they construct and transform knowledge with others, knowing we can learn to be wiser when confronted by other viewpoints (Tetlock and Gardner 2015).

Currently, solutions for complex decision-making, forecasting and wicked problem solving are sought through increasing the capacity of computing. Ever larger quantities of information are acquired and analyzed. But the core challenge is not increasing the quantity of information, but instead being able to discern what is valuable; as well as to recognize and create the right connections between disparate pieces of information.

Wicked problem solving and radical breakthrough innovation calls for new thinking skills. It requires various forms of resilient intelligence and clever ways to construct and integrate information together. But let’s start with a question: how can we *know* in the first place and how do we form knowledge?

TO BE SMART, INTEGRATE DIVERSE FORMS OF KNOWING

There are four different ways of knowing and acquiring information: through authority, reason, experience and *noetic knowing*.¹ In schools, information transmission is mostly based on the first two, authority and reason. These can be called external ways of knowing. Even though experience is a common way of knowing and learning, it is not usually well integrated into formal education. Noetic knowing is in turn mostly excluded from education. Experience and noetic knowing can be labelled as internal ways of knowing. Intuitive information is embedded in these two forms of knowing.

Currently, the term *intuition* is used as a common label for completely different types of information, varying processes and diverse outcomes that are not always clearly identifiable. The term intuition is used to describe different *types of knowledge*, for example subconscious knowledge, instinct, embodied cognition or expertise-based information. It describes *experiences* such as ‘something is not matching,’ or *sensations* such as goose bumps and gut feelings. The term intuition is also commonly used to describe various *processes of intuiting*, such as emotion-based action, non-verbal sensing and direct knowing. Further, it is also used when talking about the *outcomes or results* of a thinking process. These can be, for example, ideas, insights, inspirations or visions.

The incoherent terminology illustrates well how unformed understanding is in this area. In this chapter, I use both terms internal knowing and intuition when referring to knowing related to the internal and intuitive faculties of mind. Nonconscious describes the opposite to conscious mental operations.

These four modes of knowing have their benefits and impediments; they may not only offer valid and reliable information but also contain vague, unreliable or false information. Therefore, it is essential as with all types of information, that we have transparent methods to evaluate the reliability and accuracy of information.

In order to construct best possible knowledge basis for new knowledge creation, we need to integrate diverse kinds of information. The scientific method is ‘*a way of combining these various approaches to understanding so that their weaknesses tend to cancel each other out, but their strengths tend to add up*’ (Tart 2009, p. 42).

WHY DEVELOP INTUITION?

In order to know more about the potential of internal knowing, we need to take a closer look at how the human mind works. Intuition is an integral part of human cognition and the nature of the human brain is inherently intuitive. The human nervous system comprises a complex, multi-layered and distributed network of billions of cells acting in myriad ways and most of this processing is nonconscious, i.e. intuitive (Laughlin 1997).

According to prevailing understanding, human cognition is based on a dual process model of the mind. The two faculties of the mind, conscious reasoning and intuiting, are integrated and work in constant cooperation (Kahneman 2011; Kahneman and Tversky 1982).

Intuitive—or nonconscious—faculties of mind are in constant communication with the environment. Intuition supports consciousness by limiting the amount of incoming information, so that consciousness—or reasoning—is not overwhelmed. If compared with reasoning, intuition handles several magnitudes more information at any given time (Lipton 2012; Zimmermann 1989).

The nonconscious selects perceptions and passes them to reasoning faculties for closer evaluation. This means that reason is supported by and in fact *requires* nonconscious cognition in order to be free to work on the kinds of problems it is well-designed to solve. For example, to analyse, compare and classify (Hayles 2014; Lipton 2012).

Typically, intuition is considered prone to biases and this is true with some forms of intuitive thought, but this is not the whole truth (Kahneman and Tversky 1982). Several studies emphasize that some intuition can be evaluated for reliability and accuracy, intuition can be used intentionally, and it can even give exact and detailed information. Therefore, intuitive processing needs to be developed and used intentionally—just like conscious reasoning and analytical thinking—to result in more reliable outcomes (Davis-Floyd and Davis 1996; Kautz 2005; Monsay 1997; Root-Bernstein and Root-Bernstein 2003; Shefy and Sadler-Smith 2004).

In an optimal situation, internal and external ways of knowing can be integrated. It is not a question of internal knowing *versus* conscious reasoning, rather of intuition *and* rationality (Dunne 1997; Shefy and Sadler-Smith 2004; Surel 2007). Combining reasoning and intuiting can result in beneficial knowledge of many kinds. This has been acknowledged for decades in several fields of knowledge such as mathematics, business, linguistics, design, creativity, decision-making and innovation (Agor 1989; Bastick 2003; Bunge 1962; Fischbein 1987; Raami 2015). However, formal education still focuses firmly on the development of reasoning faculties or external ways of knowing.

WHAT CAN WE LEARN FROM DESIGN RESEARCH?

Intuition is the driver of innovation and creative ideas involving extreme novelty. Design studies have a long tradition of researching iterative, cyclic and intangible aspects of designing, such as distributed cognition, building knowledge structures and sharing expertise. In these studies, design is frequently mentioned to be one of the most challenging

cognitive tasks since it operates in the area of complex problem solving (Buchanan 1992; Goel and Pirolli 1992; Laamanen and Seitamaa-Hakkarainen 2014).

Expertise in design seems to be different from other forms of expertise, since many creative experts define and manage problems by keeping them under-specified, while other experts tend to solve problems by adopting the most rational approach (Cross 2004). Many talented designers do not concentrate excessively on problem analysis, rather they let their expertise and intuition focus on quick problem scoping and sketching. In this process, sketching becomes a tool for understanding the outlines of problems, which then feeds idea generation. For these reasons, design expertise is frequently identified differently in terms of its problem structuring, formulation and solution-generating approach (Cross 2004).

Designers frequently underline the importance of intuition in their creative process; not without criticism from other professions. However, there is a lot of variation in how designers describe their intuition or the methods by which they benefit from it. For example, intuition can filter usable outcomes from numerous amounts of raw data, give new directions to possible solutions, stimulate formulation of new ideas, connect surprising perspectives or exceed the limits of conscious reasoning (Raami 2015).

Several studies suggest that the most talented design students use more intuitive faculties while working and that they are more capable of using different cognitive styles and easily switch between them (Cross 2004; Schön 1988). Further, intuitive thinkers use fewer stereotypes than conscious thinkers, since it is hard to avoid ‘jumping to conclusions’ when a person thinks consciously (Dijksterhuis et al. 2006). The need for certainty may lead to premature generalization or ignoring information that contradicts personal bias. The students who think holistically seem to benefit from easy access to different modes of thinking, which creates a head start compared to analytical thinkers (Roberts 2006).

Design knowledge tends to emerge from conscious not-knowing, or unlearning, therefore, in the process of designing, an initial state of intentional ignorance or emptying of the mind is needed to be completely open up to alternative possibilities. Since design strongly intertwines reasoning and intuiting, the chosen means to acquire knowledge directly affect knowledge production. Whether the information is acquired and processed through intuition, or analysis leads to different

types of knowledge construction, the form of inquiry leads to a specific body of knowledge since it influences the constitution of the knowledge and what is gained through the process (Nelson and Stolterman 2003).

WHAT CAN WE LEARN FROM NOBEL LAUREATES AND OTHER VISIONARIES?

Scientific intuition seems to be a special type of intuition since it is able to simultaneously grasp the whole while being rooted in profound knowledge of its individual parts (Marton et al. 1994). Typical to domain-specific expertise is the ability to surpass the limits of single cases and perform mental operations on a more abstract and conceptual level (Cross 2004; Ericsson 1999, 2006). These processes are embedded in intuitive faculties of mind. Numerous case studies emphasize that intuition is the primary thinking mode used for discoveries and inventions while conscious reasoning is used for argumentation.

The development of emerging professional expertise requires usually at least 10 years of active practice. At this point, the delving results in the accumulation of several cognitive resources: a case example database, personal experience and personal mental models in nonconscious faculties. The development of expertise continues, but it constantly requires dedicated application of the individual, otherwise performance will be modest (Bereiter 1993; Ericsson 2008; Gladwell 2008).

With robust expertise, a person can utilize a large subconscious database of information, including tacit and embodied dimensions. The cognitive processes that experts typically exploit include: varying pattern matching and recognition processes, accumulation of evidence, random sampling or automatic construction of mental representations. The information may be derived from memory traces combined with new information, mental representations or comparison with exemplars, prototypes or images. Often the processes to construct or interpret knowledge is completely nonconscious and only the result enters awareness (Glöckner and Witteman 2010).

In addition, intuition correlates with empathy, which can be understood as a form of acquiring information, where, through the perception and feelings of oneness, a person can perceive sensations that come from outside personal experience. Typically, intuitive individuals have sufficient empathy with a problem, including caring for and involvement

with a specific context. This setting enables a person to create a sensitive personal relationship with and a degree of command of the issue (Bastick 2003).

Further, those experts who are capable of exceeding the boundaries of prevailing knowledge seem to benefit some other types of cognition too. Research made on Nobel laureates and distinguished inventors have recognized a cognitive category labelled extra-cognitive abilities. These refer to phenomena such as internally developed and highly subjective standards, norms, intentions, beliefs, preferences and values. Parallel with other types of experts, these individuals deeply enjoy working and are passionate about their area of study. This manifests as continuous curiosity, questioning attitude and the use of intuition (Shavinina 2009; Shavinina and Seeratan 2004).

For these people, excellence is a *virtue*. Further, they employ self-regulation skills including the ability to monitor their mental and emotional dimensions. Their level of self-esteem, courage and ability to tolerate loneliness are high. And of course, many of them are challenging personalities with highly personal ways of working and processing information (Shavinina 2009; Shavinina and Seeratan 2004).

WORKING “WITH SELF” AND INTEGRATING WHAT YOU SAW

Case studies of Nobel laureates reveal some characteristics that are common to these visionary individuals. Many of them underline the role of visual intuitive experiences and the importance of ‘seeing.’ Some describe seeing as a way of perception, for example, imagining being immersed within the research project. Others describe the act of seeing as visualization and active use of the imagination including handling multiple dimensions. Further, several report having exceptional ways of working and accessing information, including, for example, feeling ‘*united*’ or having experiences of direct knowing (Holton 1978; Keller 1983; Larsson 2001).

Nikola Tesla has often been mentioned as the most impressive example of a user of mental imaging. Tesla’s mental images of inventions were so vivid that he could run the detailed mental models in his mind for weeks and examine them with his *mind’s eye* (Monsay 1997).

August Krogh, a Nobel laureate in Physiology or Medicine, developed a considerable part of his work while lying in bed in the evening, trying to imagine processes and experiments. His fruitful ideas came seemingly

out of the blue but he worked with them consciously. He never made sketches prior to completing the arrangements of his thoughts, since he felt they would hinder the free flow of ideas (Larsson 2001).

Robert A. Milikan, who was awarded the Nobel Prize in Physics, saw electrons. He trained to develop intense powers of visualization, which assisted in drawing conclusions; and behind these, an unanalysed, yet preconceived, theory about electricity, which gave him a lens with which to look and interpret his observations (Holton 1978).

Hideki Yukawa, who received the Nobel Prize in Physics, often lay awake at night thinking about the problem of the forces holding together the nucleus of the atom. He had a notebook beside his bed and one night, an insight came to him: there must be a relationship between the intensity of the force and the mass of the binding particle. On the basis of this idea, he found a particle he called a ‘meson’ (Larsson 2001).

Linus Pauling, a Nobel laureate in chemistry, solved the mystery of alpha keratin molecules while forced to stay in bed with a heavy cold. He floated the ideas freely in his head and continued sketching images of the molecule on a page, which he folded at the points where the molecular structure would allow it. After several attempts, he succeeded in forming a pipe-like structure that enabled the spiral form. He has described the hunches or inspirations that come to him as the result of training his unconscious mind to retain and ponder problems (Larsson 2001).

Albert Einstein was led to the idea of relativity by the vision of traveling on a light beam (Holton 1973, p. 358). Einstein’s mathematics was to be ‘seen’ and to him ‘*the objects with which geometry deals seemed to be of no different type than the objects of sensory perception which can be seen and touched*’ (ibid., p. 638).

Barbara McClintock, a researcher of corn genetics and Nobel laureate in Physiology or Medicine, practised intense and systematic observation and interpretation for years. She had built a theoretical vision, a highly articulated image of the world within a cell. McClintock described her experience of knowing as a ‘*feeling for the organism.*’ As she watched corn plants grow, or examined the patterns on the leaves and kernels, or looked down the microscope at their chromosomal structure, she saw directly into an ordered world of mental images.

McClintock’s way of perceiving information was strongly based on visual perceiving, yet included some other dimensions. She called her system, ‘*integrating what you saw.*’ She simultaneously read the environment with her physical eyes as well as with her mind’s eye. The physical

spots McClintock saw on the maize kernels represented for her a hidden genetic meaning that she could read simultaneously. For McClintock, the eyes of the body *were* the eyes of the mind. Sometimes, McClintock described the material as ‘*not integrating*,’ which meant there was something wrong—an experience described also by many other professionals (Gigerenzer 2007; Klein 2004; Keller 1983).

Through describing these experiences, McClintock spoke about the deepest and most personal dimension of her experience as a scientist. She also spoke of the ‘*real affection*’ one gets for the pieces that ‘*go together*.’ ‘*As you look at these things [chromosomes], they become part of you. And you forget yourself. The main thing about it is that you forget yourself*’ (Keller 1983, pp. 115–117).

McClintock explains that she doesn’t know how she is able to know, she describes having always having an ‘*exceedingly strong feeling*’ for oneness. ‘*Basically, everything is one. There is no way in which you draw a line between things. What we [normally] do is to make these subdivisions, but they are not real*’ (Keller 1983, p. 204).

The examples above demonstrate the importance of various forms of perceiving and processing information while making breakthrough scientific discoveries. The ability to see things in various forms through varying methods—even though they exist only in one’s mind is an important resource for all creative work.

Some of these experiences described above have similarities with flow experiences containing highly focused states of consciousness, working on the edge of one’s competence as well as effortless performance (Csikszentmihalyi 1996). Several of these visionaries report benefiting from relaxation and meditation. Nobel laureate Dag Hammarskjöld even created a meditation room in the UN Headquarters. Some also mention altered states of mind or extraordinary experiences (Larsson 2002).

One of the most important aspects is that studies of Nobel laureates reveals that when facing a truly difficult problem, instead of working excessively on the problem itself, these individuals report starting to work with *themselves*. In other words, instead of collecting additional information and analysing it, they turn inwards. However, they cannot explain in detail what actually takes place (Keller 1983; Larsson 2001).

In order to share these highly personal insights and construct knowledge in teams, it requires a shared language. Based on vision—our most public and our most private sense—it gives rise to a kind of knowledge that requires more than a shared practice to be communicable: it requires a shared subjectivity.

THERE IS VAST UNTAPPED POTENTIAL OF INTERNAL KNOWING

The way the human body and mind work is ingenious. At any given time, there is a continuous and extensive information transfer process going on. Even though recent research has made remarkable progress in this area, the truth is, there is more unknown than known about how information transfers or is stored inside the human body. However, different fields of knowledge can enrich our knowledge related to the processes of inventing and intuiting.

Recent neuroscience studies state that before insights are generated, there is a change in focus that quiets visual input and switches attention to internal activation. Even the smaller ‘Aha!’ experiences are preceded by a switch to internal attention and activation of nonconscious. These studies suggest that it may be that any behaviour that encourages quieting of thoughts can be helpful in gaining insight. This process seems to be similar to a large domain of cognition that also handles perception and language processing (Bowden et al. 2005; Jung-Beeman 2008).

Psychological research outcomes emphasize that intuition is embedded in varying cognitive processes. A *clicking-in* type of experience follows a period of intense concentration whereas a Eureka experience is preceded by a period of incubation and inattention. In other words, a Eureka experience is embedded in re-centring—an experience of new permutations of relations between ideas and a novel and unconventional combination of thoughts. Typically, a coincidence in the physical world acts as a spark and causes a mental process leading to a Eureka experience. The classic examples are Newton observing the falling apple, Archimedes taking a bath and James Watt watching a kettle boil (Bastick 2003).

When observed from the perspective of biology, the transfer of intuitive information is not limited inside brain. For example, the human heart has neural cells that may store short-term and long-term information independently of the brain (McCraty et al. 2004a, b). This is aligned with research involving heart transplant patients that suggests that the heart may store very detailed and accurate information that can be transferred with the organ (Pearsall et al. 2005). Further, the intestines and stomach have neurons of their own too (Gershon 1998; Järvillehto 2015). Therefore, trusting gut feelings or heart’s sensations may have a scientific, biological foundation we have not been fully aware of.

From the intuition research perspective, or when taking a closer look at individual experiences through case studies, there emerges a vast

spectrum of experience. The designers I have researched and coached report having intuitive experiences varying from small hunches, flashes or feelings of promise to more profound sensations such as complete visions, experiences of serendipity, or large quantities of inspirational material taking on a life of its own. Some designers describe even highly personal, extraordinary experiences, which may challenge their personal world view and way of thinking (Raami 2015). Even though the research does not explain the foundations of such experiences, the experiences themselves are significant, since they underline that creative individuals are able to harness their intuition and apply it to the creative process.

Among designers, many can recognize different ‘*sources*’ or ‘*origins*’ of intuition. During these moments, they typically feel that they are at their most creative. There is a strong feeling of ‘*receiving*’ ideas, being energized or ‘*carried*’ and being empowered. Many of these people report a qualitatively different experience between ‘*receiving ideas*’ and the experience of forming ideas based on own imagination (Raami 2015).

Indeed, intuition may originate from various sources. The process of intuiting may be based on the various forms of knowing mentioned above. It can combine different sources of information coming from the mind, body, thinking, memory, environment, feelings, embodied cognition, senses or extended senses. Typically, intuition is entangled with expert knowledge. However, sometimes intuitive faculties of the human mind may know something that the reasoning faculties are not at all aware of; research, for example in the area of presentiments, strongly supports this proposition (Bechara 2004; Bem 2011; Dossey 2013; McCraty et al. 2004a, b; Radin and Sheehan 2011; Sheldrake 2011).

All of these perspectives from different fields of knowledge underline the possibilities of internal knowing. In order to benefit from or develop intuitive faculties, it is not necessary to have a fully resolved explanation of how the human mind or intuiting works. It is enough if it works and can provide certain benefits. Further, cutting-edge research challenges the boundaries of knowing, so even if explanations existed now, they may be out-dated as science advances in the coming years.

ARE THE BOUNDARIES OF KNOWING CRUMBLING?

What we know and how we know it is not an easy task to research. For example, neither neuroscience nor genetics can extensively explain where information is stored or how it is retrieved (Powell 2009).

In the area of physics as well as in anomalies research, some experiments challenge the prevailing scientific paradigm. For example, some research suggests that at times a person is able to access information that exceeds the boundaries of expertise and surpasses even the limits of time and place (Powell 2015; Radin 2008; Radin and Sheehan 2011; Sheldrake 2012; Targ 2012).

Due to the recent increasing number of such unconventional research outcomes, some hundreds of accredited scholars from various fields of science have been calling for an open study on all aspects of consciousness, including the inexplicable subjective dimensions of human experience (Beauregard et al. 2014; Cardaña 2014). At the moment, the biggest barriers are the lack of funding and hidebound attitudes.

Several studies on the history of modern science show that many brilliant ideas come to people who are in some sort of intuitive or altered state—for example dreams, reveries, extraordinary insights, meditation, or drug-induced states—seemingly out of the blue (Bastick 2003; Holton 1978; Larsson 2001). It is significant that these experiences have resulted in exceptional and remarkable outcomes. For example, Larry Page, who founded Google, has described being awakened at night with an idea: what if he could search all the information from the Internet and present the results only in one page. He wrote the idea quickly down since typically thoughts between dreams have faded in the morning. In these experiences, information is received in a form of clear thought or an idea resembling a download experience.

Studies of highly intuitive individuals play an important role in revealing the potential of the human mind by unfolding and demystifying the process of intuiting. Highly intuitive individuals have marked out a pathway toward intuition development, especially by exceeding the limitations of accessible information as well as by exposing the methodology of intuiting.

The more unexplainable the personal experiences are, the greater stigma they tend to carry. Highly personal or extraordinary experiences are not shared. The experiences may be consciously ignored or explained away due to a couple of reasons.

Firstly, no-one wants to be laughed at or ostracized. For example, Nobel laureate McClintock was a highly respected scientist by peers until around 1950s when her thoughts started to significantly differ from the mainstream. In scientific conferences, her lectures were marked by silence since nobody understood what she was talking about. Colleagues

started to laugh at her behind her back and ‘mcclintocknism’ became a synonym for an unscientific approach. In 1953 she quit all academic publishing due to severe criticism. It was only in 1980s when she was rewarded with a Nobel Prize that it was evident she was far ahead of her own time. Historically, she has been the only woman awarded an undivided Nobel Prize in medicine (Keller 1983).

Secondly, the human consciousness can bend, shrink or even split, but it cannot tolerate a break in coherence (Hayles 2014). This leads to a situation where consciousness easily edits and modifies reality to fit personal expectations, at the cost of a more accurate rendering of reality, by misinterpreting anomalous or strange situations (Hayles 2014). This may result in ignoring or shutting out anomalies even before they reach the conscious. In other words, if our mental compartments are not open enough, we cannot escape our current thinking models. We perceive only those perceptions that fit our current mental models and filter out others.

When facing extraordinary information, it may lead to a situation where intuitive information strongly contradicts an individual’s current understanding or beliefs. These situations require mental resilience, since it is emotionally challenging to handle a situation where incoherent pieces of information conflict—yet at the same time they coexist.

This situation is a double-edged sword: on the one hand, intuition is prone to biases when an immediate pattern recognition process matches the current situation to previous ones stored in memory (meaning WYSIATI what-you-see-is-ALL-there-is), resulting in misinterpreting the current situation (Kahneman 2011). On the other hand, the conscious mind may edit reality by ignoring some perceptions. This highlights the importance of authentic perceiving, which can be developed with practice (Shefy and Sadler-Smith 2004).

WHAT IS INTENTIONAL INTUITING?

As described earlier, reasoning faculties operate with low speed and have extremely limited information processing capacity when compared to intuitive faculties. Intuitive faculties can filter enormous amounts of raw data, while reasoning focuses, analyses, estimates and compares at slow pace. These two compartments are highly specialized and work in perfect balance: intuition picks important perceptions and passes them onwards to reasoning faculties for further elaboration (Hayles 2014; Lipton 2012).

However, it is important to note that many references suggest that this process can be overturned: the conscious mind can be used to acquire specific information from intuitive faculties through intentional intuiting (Kautz 2005; Raami 2015; Targ 2012). When a person considers a task, not only the conscious but also the nonconscious faculties of the mind start acquiring and processing perceptions and information in line with the intention (Lipton 2012).

Research with highly intuitive individuals suggest that it may be possible to acquire diverse kinds of information through intuitive faculties (Kautz 2005; Peirce 2013; Targ 2004, 2012). But, how in a practical level can one harness intuition as part of a cognitive process? Even though intuiting happens outside of rational cognition and is not fully understood, there are some parameters we know through research in various fields. Figure 6.2 illustrates this process step-by-step.

The foundation of intentional intuiting is the ability to wonder. It is beneficial to start with a playful and questioning attitude ‘*what if*’ or ‘*could it.*’ Designers famously use question-prompts such as ‘*how might we*’ (known as HMW questions) to provoke an exploratory thought and design process. The resulting hypothesis can vary from moderately challenging to entirely implausible, depending on how pragmatic or radical one wants to be.

When attuning to intuition, a prerequisite is openness of mind—known colloquially as *the ability to look at something with a fresh set of eyes*. Typically, we bring to situations a ready mind-set and a tendency to uphold pre-existing understanding of problems. From this starting point, we easily lock and narrow our thinking in a way that precludes perceptions and alternate possibilities.

It is very challenging to pose in one’s mind a totally new position and radically different viewpoint. If it was simple, we would not have insolvable problems. Solving the impossible problems means we must consider it somehow possible in the first place. However, sometimes it is so difficult to set the mind in a new position that it is easier to label the problem *impossible*. To overcome this, integrating playful attitude and intention can ease the process.

The moment of intuiting may take place accidentally—Eureka! Experiences—but it can also be acquired intentionally. At this phase, the ability to perceive becomes the most important: what type of sensation, hunches, feeling or images are we able to let enter our minds? With practice, a person can develop their sensitivity to varying types of

PROCESS OF INTUITING:

| Foundation | Prerequisites | Moment | Right After | Outcomes |
|------------|---------------|--------|-------------|----------|
|------------|---------------|--------|-------------|----------|

+ maximizing the potential of intuiting

| | | | | |
|--|--|---|---|--|
| “what if?” world view, possibilities, physical limits, beliefs | attuning, open mind, sensitivity, support, inspiration, intention | intuiting, data acquisition, info retrieval, acceptance, oneness | new perspectives, insights, conjunction, evaluation, judgement | solution, product, decision, action |
|--|--|---|---|--|



| | | | |
|---------------------------------|--|--|---|
| blocks, restraint, denial | biases, fears, emotional attachments, imagination shutting off | dissonance, doubts, dissociation, narrow- mindedness | errors, failure, starting over, learning |
|---------------------------------|--|--|---|

— limiting the potential of intuiting

FIELDS OF KNOWLEDGE RESEARCHING THE AREA:

| | | | |
|-------------|---------------|-----------------------|------------|
| Philosophy | Cognitive | Creativity Research, | Business |
| Biology | Neuroscience, | Design Studies, | Studies, |
| Linguistics | Consciousness | Educational Studies, | Innovation |
| Physics | Research, | Contemplative Studies | Studies, |
| | Intuition | | Decision- |
| | Research, | | Making |
| | Psychology | | |

Fig. 6.2 Maximizing the potential of intentional intuiting (Raami 2015)

stimuli. This is essential since intuiting is a way to access multidimensional information.

The moments after intuiting are closely intertwined with the act of intuiting. Often, it is not easy to perceive a difference between these two since intuition is extremely rapid. This phase is probably the most vulnerable part of the process since insights generated through intuition can seem untethered from anything known. It is not until this moment that intuitions can be consciously noticed, verbalised or shared with others.

At this point, intuitive insights can be discerned from biases or other untrustworthy signals; however, this requires good discernment skills.

Intuition happens outside of logic and is accessed and grasped internally; therefore, it cannot be evaluated only with reasoning and analysis. Discernment is an individualized competency requiring individuals to develop their own specific methods.

Information retrieval through intentional intuiting does not require the application of intuitive information. In other words, acquiring intuitive information does not mean we are forced to think or act based on intuitive information. Before bringing intuitive information into a decision making process, it can be evaluated, tested, compared or integrated with information acquired through other means.

Failures and mistakes are important. Without making mistakes, it is hard to develop intuiting to its full potential. In the case of failure, the process can be just restarted. In optimal cases, intuitions and insights lead to new knowledge, new practices and breakthrough innovations. And, in all cases, they lead to learning.

In summary, it is beneficial to collect all intuitive information before turning to reason, partly because analyzing intuition rationally has been shown to reduce the accuracy of intuitive judgements (Nordgren and Dijksterhuis 2009). Further, intuitive information appears in ambiguous, multidimensional or non-verbal form and needs fresh eyes and open mind to be successfully captured. After information retrieval, intuitive impressions need careful formatting and skilful verbalization before they can be understood or shared.

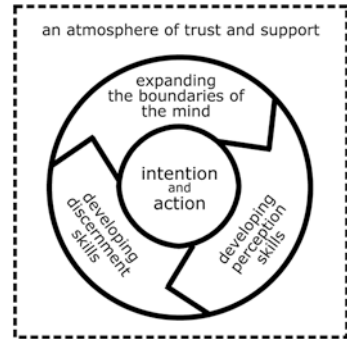
HOW TO SUPPORT INTUITING IN PRACTICE?

Now let's elaborate the moment of intuiting and the moment right after. Sensing more delicate signals or discerning the correct signals out of noise is not always easy, but it can be practiced. However, it may be time consuming since there are various types of intuitions and the whole process of intuiting is embedded in complex and unknown processes (Claxton 2000; Hammond 2007; Hogarth 2001, 2008).

I have been working in the grass-root level of creativity and intuition coaching for more than 10 years, running Coaching Creativity courses for university-level students since 2003 and Coaching Intuition courses since 2008.

Based on personal professional experience, intuition coaching can result in both applicable and exceptional results. However, the coaching challenge is generally not actually to develop intuition, but rather

Fig. 6.3 The components supporting intuiting (Raami 2015)



to enhance cooperation between the two faculties of mind: conscious reasoning and intuition. In other words, intuitive faculties do not need developing, but the process of intuiting does. To benefit intuition, it is indispensable to train the mind to be less resistant and more accepting towards the unknown, uncertain and ambiguous.

Intuition cannot operate in the narrow or linear compartment of rational cognition. Intuition operates in a multidimensional information space. Therefore, the rational compartment of mind needs to be slowly expanded. In coaching session, we can perform drills to enhance the skill of perceiving and discernment, which work as a link between conscious reasoning and intuition.

The main components of supporting the process of intuiting are illustrated in Fig. 6.3. The process consists of three continuous and rotating steps of development: expanding the boundaries of the mind, developing perception skills and developing discernment skills. To implement, test and develop intuition, intention and action are needed, while, to make this whole process possible, an atmosphere of trust and support is a prerequisite (Raami 2015).

PERCEPTION AND DISCERNMENT SKILLS TO FINE-TUNE INTUITING

How can we recognize intuitive information in the first place? How are we able to receive multidimensional information? How can we develop sensitivity to notice more delicate and subtle signals? How are we able to discern the meaningful and important information out of the noise?

The skill of perception is needed in the recognition of signals and that of discernment in excluding the biases inherent in intuition. The development of these two skills usually leads to a more sensitive and precise ability to intuit.

Several studies from neuroscience and intuition research stress the importance of discerning between useful hunches and perceptions that can lead to beneficial intuiting and attaining valuable information (Bowden et al. 2005; Davis-Floyd and Davis 1997; Kautz 2005).

When we discern perceptions, and absorb information, we need to pay careful attention to the process. Intuitive information is the product of extremely rapid multidimensional information processing and sensations that are not always easy to understand or rationalize. Therefore, there is a risk to misinterpret them or to derive misleading conclusions out of them.

The situation can be illustrated with an example of another type of perception. When watching a mirage, the surface of the road is fluctuating, appearing to be covered with water. The heat waves are real, but in reality, the surface of the road does not move nor is it wet. The first part of the perception is real, but the conclusion derived is false.

Both our intuitive faculties and reasoning faculties are prone to biases. Therefore, we need to pay attention to how we construct and evaluate varying types of information in order to educate capacious thinkers.

EXPANDING THE BOUNDARIES OF THE MIND OPENS UP POSSIBILITIES

The rational mind can benefit from understanding that intuition is a precious part of the thinking process, which supports numerous everyday functions and can lead to superior outcomes in decision making and creating.

The foundation for unseen solutions and radical breakthroughs is rooted in openness of mind. Typically, human biology, physiology, physics and experience constrain what we consider plausible. However, prevailing, common beliefs are frequently overturned by new ideas, observations and scientific discoveries. Therefore, we cannot limit the search for solutions to the current understanding. If adopting a hypothetical '*what if*' or '*how might we*' attitude, the questions provide the mind a new cognitive frame, and intuition starts to work towards solutions. The mind begins to look for signals, clues, connections, patterns or useful perceptions for further evaluation.

Often, radical theories and odd perspectives lead to emotional resistance, cognitive perturbation or confrontation, but these are valuable and important signs of approaching the corners of one's mental compartmental boundaries. This is a natural and important phase of the process in which the old belief systems, often unknown to the person, are made visible hence they can be deconstructed or renewed.

INTENTION AND ACTION CREATE A *DYNAMO*

Intention and action form the core—the dynamo—of intentional intuiting. In practice, the actions can include, for example, attuning, implementing, practising, testing, developing, or sustaining. Intention can manifest, for example, in the form of interest, motivation, inspiration, concentration, focus, aspiration, patience, or the use of willpower.

While using intention and attuning intuition, it is necessary to be aware of the biasing effects of intuition. Emotional attachments like fears and wishful thinking can start biasing, narrowing or restricting the free flow of intuition, so it is beneficial to learn how these can be set aside (Raami 2015).

The model is dynamic in nature. The process of intuiting evolves and develops together with the individual. Perceptions, discernment and expanding the mind intertwine and feed each other. In practice, the process seems to cause a positive loop, where intuitive processing increases understanding about intuition, which then increases readiness to benefit from intuition more often. When paying attention to the process of intuiting, one can focus on any part of the figure. Even a short period of observing one's intuition including these components can help, but observing can be continued for years or even decades.

AN ATMOSPHERE OF TRUST AND SUPPORT

Exceeding the limits of the known or nurturing unformed ideas requires both internal courage and an encouraging atmosphere. The most important role of a teacher or coach is to support and encourage because, as students attune to intuition, they are confronted with uncertainty.

The teacher needs to be somewhat familiar with their own intuitive process in order to share their personal understanding and experiences. The teacher has to expose themselves to the process of learning about themselves. Symbolically, the teacher needs enough courage to be able

to ‘lean’ towards labile situations and uncertainty. This allows new possibilities to emerge. In this setting, the teacher enhances and boosts the training process.

HOW CAN WE EVALUATE THE RELIABILITY OF INTUITIVE INFORMATION?

The last topic to be elaborated is discernment, which enables the ability to recognize reliable or biased intuitive information. Current intuition research offers some tools for better discernment.

In general, practice and trust appear to be crucial steps when interpreting intuitive signals and the reliability of intuition (Nadel 2006). However, feelings of correctness accompanying intuition are not necessarily a good measure of the accuracy of the intuition. Doubt also plays a significant role: any intuition, regardless of how strongly experienced and whether it is correct or not, can be swept aside by doubt.

Heuristics models suggest that intuition is so prone to systematic biases and errors that intuitions derived from it should be rationally analysed (Kahneman 2003; Plessner 2008). However, while heuristics biases are certainly undeniable, exposing intuition to constant rational judgement poses a paradox: rationally over-analyzing intuition has been shown to reduce the accuracy of intuitive judgements (Nordgren and Dijksterhuis 2009).

In practice, this paradox becomes a problem: a person cannot know when analysis becomes over-analysis, or when the situation leads to poor intuitive awareness through little or low-quality feedback (Hogarth 2001, 2008; Shefy and Sadler-Smith 2004).

However, the heuristics tradition is a useful reminder for the development of intuition. Heuristics are just one form of intuiting. If intuition is seen as a holistic, non-conscious representation matching process of past experiences, then proper feedback is critical to the development of intuition accuracy (Plessner 2008). Naturally, this evaluation cannot be carried out on all types of intuition, which makes such evaluation of accuracy challenging (Piatelli-Palmarini 1994).

In an optimal situation, a person has enough courage and trust for intuitive experiences to arise and to be attentively sensed. The best way to evaluate reliability of intuition is simply testing in practice; reliability can be analyzed to a sufficient degree, while respecting the

meaningfulness of such experiences. Further, studies of highly intuitive individuals reveal that they have developed personal and innate methods for evaluating the reliability of intuitive information (Davis-Floyd and Davis 1997; Kautz 2005; Mayer 2008; Targ 2004, 2012).

CONFIRMATIONS AND BIASES OF INTUITIVE INFORMATION

Based on literature and my research with designers, some individuals who regularly and successfully benefit from intuitive information have developed personal ways to evaluate the reliability of their intuitive signals. They report becoming aware of special signals or sensations, which work as confirmations for them. They work as a form of guidance, underlining the importance or the correctness of their intuition, or revealing the biases. These confirmations are personal and significant to their owners; the sensitivity to recognize them has developed over many years of reflection (Davis-Floyd and Davis 1997; Kautz 2005; Peirce 2013; Raami 2015).

When using confirmations as a tool for evaluating the reliability of intuition, a person needs to be able to interpret the signals instantly and correctly. This brings us to the moment of ‘right after’ presented earlier. Sometimes, the signal may be biased. Sometimes, it is too fast and observation too slow. Sometimes, noise overpowers the clarity of the signal. Sometimes, there is misinterpretation of a signal. With every type of signal, there are biases, which should be excluded to get a reliable confirmation.

Some of the confirmations can be ‘stronger’ or have more emphasis than others. However, if they are absent, it is not necessarily proof of an incorrect or false intuition. When a person is familiar with their process of intuiting, they often get confirmations of some kind. Even design students who are not very aware of their process of intuiting report these confirmations. Usually, a person can sense the signal through one personally typical source or sense, for example, goose bumps (Raami 2015).

Typical physical confirmations are for example sensations like ‘*gut feelings*’ or ‘*cold shivers*.’ With physical sensations, the usual bias is the misinterpretation of signals, for example, confusing the ordinary physical bodily sensations with intuition.

Some individuals get certain feelings or emotions like ‘*vibes*’ or ‘*resonance*.’ Highly intuitive individuals constantly report that with reliable intuition, all emotions are excluded. These may be fears, wishes, hopes,

attractions, desires, impulses, disgust, exclusion or ignorance. Intuition can be easily biased by emotional attachments.

Several individuals report mental signals like ‘*seeing*’, ‘*visioning*’ or an ‘*insight flashed*.’ The most common bias associated with mental sensations is probably confusion with imagination. Many scholars state that there is a fundamental difference between intuition and imagination, insight, instinct or memory. Typically, imagination manipulates, edits and analyses, whereas instincts are inbuilt evolutionary reactions related to surviving (Davis-Floyd and Davis 1997; Kautz 2005; Shefy and Sadler-Smith 2004). These can benefit creative thinking and complex problem solving. However, it is highly beneficial to be able to discern the differences between them.

Occasionally, the confirmations are extraordinary by nature: an individual may see ‘*twinkling sparks of light*’ or feel that something is ‘*integrated*,’ ‘*immersed*,’ ‘*illuminated*,’ or ‘*connected*.’ These types of signals are often reported along with scientific discoveries.

In highly personal sensing, the signal may be biased by misinterpretation, or it may be disturbed with obscurity that may label, colour or bias intuitive mental images, impressions or sensations. If a person’s mind is very strong, it may start to create a belief, which of course may help create the mental images that assist invention. However, creating by belief and intuiting are different mental operations as well.

The variety of confirmation and biases underline the importance of self-knowledge. For sceptics, it would be tempting to claim that all these confirmations are biased through creating by belief, but according to the experiences reported by designers and highly intuitive persons, this is not the case. With the aid of these confirmations and biases, many people seem to be able to recognize reliable intuition, with accuracy and reliability. However, according to many references, the intuitive process evolves. It renews and changes along with the person using it. Therefore, internal alertness should be habitual.

TOWARDS A WORKING METHOD OF INTUITION

The issues presented above unfold some aspects of the human mind, possibilities of knowing and personal experiences of intuiting related to problem solving and creative work. These may bring new insights for teaching and learning.

Decision-making is an individual act; therefore, the perspective and capacities of a single individual are extremely important, as stated above, because coherent decision-making is the key to sustainable wellbeing. Sustainable choices made through better decisions will improve the coherence of natural and social systems.

However, many educational structures are outdated, rigid and conflicted by many competing agendas. Hence, it is not straightforward to introduce new ways of thinking and doing into this ossified context. It does not help that current attitudes inside and outside of education systems tend to favour competition, measuring, exclusiveness, segregation and ranking, which are values based on dissociation and self-interest. Among the many problems this creates, one is that it can assign a negative value to an individual, effectively removing them from 'productive' society. But perhaps through greater recognition of the value and utility of intuitive and creative processes, the full potential of every learner can be realized. This is especially true for today's students who face disquieting uncertainty about the future.

Changing attitudes and unlearning limiting mental structures, or implementing something radically new takes time. This is true even in the academic world that largely operates in siloes leaving gaps between domains. Knowledge is constructed in canon: new knowledge is developed mostly with like-minded colleagues. In the worst case, this leads to unilateral and stagnant viewpoints where transgressive or second order research is not initiated and decision-making is based on avoiding mistakes with respect to a single disciplinary silo.

Complex, wicked problems cannot be solved with single domain expertise and a rigid mindset. How can we form new, shared knowledge structures that generate societal impacts and sustainable future? And how can we bridge the old educational system into a new one and construct a transition pathway? We need our intention and thoughts aligned towards finding new ways to initiate change on multiple levels: changes in single individuals, structures and systems.

SUMMARY

Decision-making, complex problem solving and radical innovating are cornerstones of a coherent and sustainable future. To be able to surpass the challenges the world is facing, we need to search new dimensions of

understanding for problem solving and innovation. To be able to solve the impossible problems requires exceeding the limits of the known.

The current scientific paradigm, beliefs and physical constraints narrow our thinking to what can be considered plausible in the first place. What we currently know, defines the question framing and problem scoping, hence narrowing the solution space. We ignore potential solutions we consider impossible.

However, it is possible to surpass ingrained understanding. There is still vast, untapped potential of the human mind. People who benefit from intuiting and resilient thinking create advances and innovation compared with analytical thinkers. Further, intentional intuiting can assist achieving new dimensions of knowing, inventing and creating. To enable this, it is indispensable to educate the mind to be less resistant and more accepting toward the unknown, uncertain and ambiguous.

This highlights the importance of self-knowledge skills and abilities to leverage internal knowledge beyond what is consciously known. Luckily, most of the skills related to internal knowing are trainable. Smart intuition can be integrated with sharp reasoning and education.

But this is not enough. We also need to create and exploit shared and intelligent knowledge structures to integrate wisdom from different fields of knowledge. In addition, an important step to be taken is the one you can take at this very moment. That is, consider that all of society's wicked problems are indeed solvable. It begins by understanding that it is *possible*.

NOTE

1. *Noetic* originates from the Greek word *noēsis/noētikos*, meaning inner wisdom, direct knowing, or subjective understanding (“IONS, Institute of Noetic Sciences” 2014).

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Unlocking the Future of Learning by Redesigning Educator Learning

Adam Rubin and Ali Brown

TODAY'S MODEL OF LEARNING: OUR CHALLENGE

Our systems of public education were built in a different era, with a set of clear underlying objectives—to sort and filter students to a set of clear outcomes, as well as to inculcate them with a national identity.

Depending on the society, there may have been some variance, but there were clear commonalities across all systems. Those objectives made sense at the time and by and large, many systems had successful outcomes. We needed citizens first and foremost, bound together with a common story—both an understanding of a unified history and an aspirational narrative for their futures. Additionally, we needed a sorting mechanism as illustrated in Fig. 7.1, that helped send people to the farm, the factory and over time, a growing knowledge economy through which college was the portal. As national economies evolved, advances in transportation and telecommunications shrunk distances, and a global

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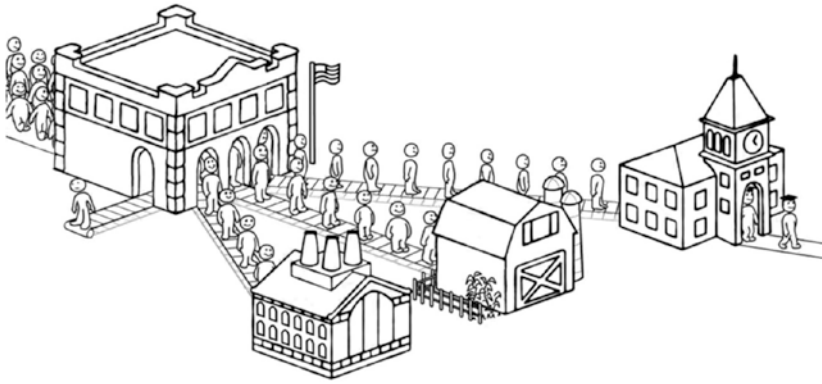


Fig. 7.1 The conveyer belt (Still taken from 2Revolutions' Future of Learning video)

economy emerged in the second half of the twentieth century that fundamentally shifted our labor needs. Farm and factory roles increasingly shifted to lower cost parts of the world, and lower wage, less growth-oriented jobs in the retail sector and the like developed as underwhelming alternatives. The impact of these shifts was compounded by significantly reduced demand for low-skill jobs because of improvements in technology. Our global economy had shifted, but the structure of our systems of education remained largely intact. This mismatch posed an increasing problem for education systems across the globe.

Over the past few decades, international policy makers have spent significant time and financial resources incrementally tweaking our existing education systems. This has been especially true in the United States where these tweaks have not been broad enough to outpace the economic and societal changes underway. Today, there is a clear and vocal consensus among all stakeholders that our model of schooling is not effectively preparing students for today, let alone for the challenges and opportunities of tomorrow.

Our model of schooling is indeed a vestige of an outdated system. But, we have not yet invented the models to which we can all say “yes.” In order to close an achievement gap and prepare all students in our evolving societies for success in careers and the future challenges that await them, *a radically different approach is needed.*

EMERGING SIGNS OF PROMISE

We are gaining a deeper understanding about the elements needed for schools to work more effectively. Research is beginning to amass evidence on correlates to student success in university and beyond. We now have reason to believe that learners do better in environments that go beyond core content knowledge, in which there is a focus on a set of essential skills and dispositions related to collaboration, communication, creativity and self-direction. School models that focus on these skills and dispositions often yield more successful students (Dymnicki et al. 2013; Chicago Research Consortium 2013).

Emerging work around personalization is showing some early cause for optimism on focusing on the unique needs of each student (Pane et al. 2015). While still developmental and lacking a significant research base, there is a growing movement of educators in the United States and internationally moving in the direction of thinking of the student as a unit of analysis and learning, rather than by cohort, class or grade level groupings. Related developments among educators and education policy in the US are moving toward more of a competency-based assessment model, or the idea of supporting students to move on when, but not *until*, ready. Here the focus is on the ability to demonstrate knowledge, understanding and skill acquisition in a deeper way. This calls into question the relevance of grade levels and many structures of school systems, including time and adult roles, thereby challenging the very firmament underpinning most school models.

We argue strongly that *personalized and competency-based learning environments are not only critical for students, but that they are essential for educators to experience as part of their professional learning*. We must fundamentally redesign our systems of pre-service and in-service training for educators. Both systems are currently modeled on an outdated system—one that is centered on the people who run the system, rather than the participants. This in turn treats these adult learners monolithically rather than individually, largely ignoring a significant and growing body of research about the science of cognition, as well as adult learning theory. These efforts also ignore a set of important trends affecting the education system more broadly.

Rather than the current focus on content and pedagogy exclusively in training, we need to provide a different kind of learner experience for our educators. This approach will have to build from their specific work

environment, and the real problems they face in that context, rather than focus on concepts that are removed from their day-to-day experiences. If we can do that, we will make learning more relevant and, therefore, higher impact, tapping into factors that motivate more learning. The work needs to meet educators where they are as learners and allow them the flexibility to engage with content based on their readiness, rather than in lockstep with other colleagues who may have different needs or require a different pace. This type of personalized learning will be a better fit for adult learners individually. There is also the need to align credentialing to demonstrable evidence of shifted practice. This is how it will be competency-based. This approach holds significant promise because it models the kind of learning that we want for students. Therefore, the process itself, as well as the learning, has the potential to be transformational.

This process shift represents an approach that is more sustainable and promises greater wellbeing for adult learners as participants, and by extension for their students and the systems in which they work.

TRENDS IMPACTING ALL LEARNERS

Context matters greatly. Before drilling down into understanding how our educators are currently trained, it is important to zoom out for a broader perspective because adult learners do not exist in a vacuum. Rather, they are significantly influenced by a set of outside trends, which impact them as individuals and as part of an evolving system of learning. Figure 7.2 illustrates a set of trends shaping the Future of Learning. Better understanding these trends can effectively influence how we shape a new system of educator training and learning.

These trends include:

- *As Technology Evolves*: What began around the turn of the twenty-first century as electronic learning (e-learning) is evolving rapidly from strictly online learning to artificial intelligence, wearables and an accelerated movement toward technological singularity. While there is a clear continuum, the trend line is a significant one. On the e-learning end of the spectrum, content is now democratized in ways that we have never witnessed. We are seeing the emergence of a growing amount of free and open learning content (called open educational resources or OER), from curriculum to lesson plans to an array

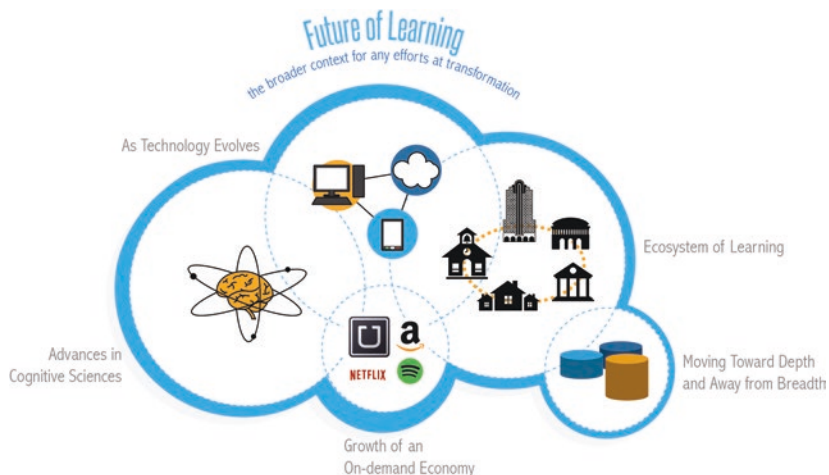


Fig. 7.2 Trends shaping the future of learning

of knowledge and skills acquisition opportunities, including Massive Open Online Courses (MOOCs), syllabi, books, etc. While it is still fragmented, an increasing number of efforts are underway to better taxonomize and organize this content. “Open internet tests” are on the rise in schools, as information is no longer the commodity itself; rather, the skill with which a learner can leverage and meaningfully apply content to demonstrate deeper understanding is what we increasingly care about. Artificial intelligence is still young but beginning to be leveraged to learn about students’ interests, habits and patterns in order to push learning experiences based on those unique needs. Significant increases in capital investments in learning technology companies point to increased confidence and provides another indicator of the growing prominence of education technology. As illustrated in Fig. 7.3, these increases reached a high-water mark of over \$2.6B globally in the first half of 2015, growing by over 50% from just a few years earlier (Adkins 2016).

What role should technology play as a way to better meet the needs of educators in their professional learning? We believe that there is an opportunity to think differently about time, space and pace for educator learning. We think it can be an important way of reaching these learners to access same and different content from one another, at same or

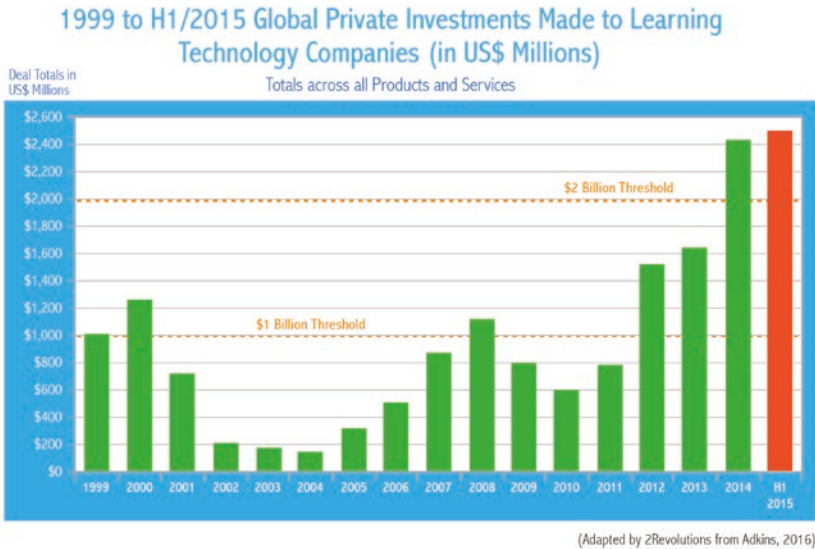


Fig. 7.3 Private investments in educational technology increase

different levels of complexity. Rather than “teach to the middle” the way most professional learning occurs, technology offers the opportunity to differentiate both content and the “dosage” of that content. While technology is an increasingly valuable tool, it is by no means the answer. Nevertheless, understanding and leveraging this trend represents an important chance to rethink the structures of educator learning.

- ***Advances in Cognitive Science:*** We know more now than we ever have before about how people learn, especially the intersection on the physiological, the psycho-social and the impact of existing knowledge on learning (National Research Council 2000). These advances are informing curriculum and pedagogy, as well as the structure of school itself. For instance, our knowledge of neuroscience is encouraging educators to incorporate more movement and frequent breaks to maximize student learning. It is pushing structural changes in schools such as later start times in some high schools to account for student alertness; and fewer summer breaks because research shows the longer students are away from school, the more they forget. Adaptive software such as online content, learning games and online cognitive tutoring tools have emerged. This allows us to rethink how content is delivered

within learning models and the role of adults in those models, all building from a deeper understanding of how different learners can engage with content and support systems.

Are there opportunities where these trends can help educators themselves learn differently? We believe that there are many ways to leverage adaptive software and different learning structures to promote greater engagement among educators and ultimately, better meet their unique needs and maximize their professional development.

- ***Growth of an On-Demand Economy:*** Technology and advances in cognitive science are being leveraged together to rapidly grow an on-demand economy for much of what we consume. We watch our movies on Netflix or Amazon Prime; we order our plane tickets on Orbitz or Google Flights; we book our vacations on Airbnb or VRBO; we now Uber or Lyft when we land in a city versus hailing a cab. All of these trends represent a significant shift in user behavior, placing goods and services at our fingertips, accessible through our laptops or smartphones. How is this trend beginning to inform education and shift how we learn? Crowdsourced lesson plan websites (i.e., Teachers Pay Teachers, Better Lesson, Share My Lesson, Curriki) are proliferating and free learning management systems (i.e., Google Rooms, Moodle, Blackboard Connect, Edmodo) are changing the landscape, providing not just learning platforms but content warehouses from which we can assemble learning experiences for students. We at 2Revolutions are partnering with eleven other national organizations in the US to make online learning resources (diagnostics, playlists and courses) free and downloadable for use in other learning systems.

When you look at the enormous size of investment in professional learning, with recent estimates suggesting the United States annually spends more than \$400 billion on formal and informal training by employers (Matlach and Poda 2016), we strongly believe that educator learning is soon to emerge as more of a market opportunity in the on-demand economy. Aggregating demand for content (subject matter specific, related to pedagogical skills and practices, micro-credentials, etc.), as well as targeted on-demand expert supports (“ask a question”, virtual coaching, etc.) represent learning experiences certain to shift the landscape. The model that we outline for the future of educator learning makes significant use of both the demand for content and on-demand expert supports.

- ***Moving Toward Depth and Away from Breadth:*** Learning more about single topics, and doing more with that content, is a decided

shift in classroom learning. Over the past few years in the United States, there has been a move to a set of common and more rigorous standards across many states—the Common Core Standards. We see a growing number of efforts that are asking students to work deeper, as evidenced by the focus on greater depth and thinking skills on new high stakes exams within K-12, such as PARCC and Smarter Balanced efforts. In the US state of New Hampshire, a groundbreaking initiative has garnered a waiver from the US Department of Education and is currently being emulated by other American states. The Performance Assessment for Competency Education (PACE) initiative leverages a federal waiver to allow a small number of school districts to replace high stakes exams with high quality performance assessments calibrated across multiple districts for reliability. These efforts and a broader push toward deeper learning have raised questions about breadth versus depth. In a growing set of school models, there is a shift underway to think differently about what students learn and how they learn it. Portfolio defenses or learning expositions are accelerating as a way to measure student learning in ways that require the demonstration of knowledge and skills, and increasingly, the ability to apply that learning to a real world context.

As we rethink educator learning, we are confident that this trend will influence both the content and process by which educators are trained, with an emphasis on going deeper in their learning versus broader to cover more topics. This shift will push our educator learning models toward fewer priorities, a more substantive treatment of those priority areas, and intentional ways in which key priorities—such as content knowledge and twenty-first century skills and dispositions—can be thoughtfully integrated in curriculum and instruction. It will begin to question notions of seat time (attending sessions and getting credit for attendance alone) in favor of building an evidence base by which to substantiate one's individual learning.

- *Ecosystem of Learning*: Within the past hundred years, learning was thought to be centered on the school building—kids learned between 9 a.m.–3 p.m. However, this is beginning to shift, as evidenced by new and different ways of thinking about and promoting a student's learning trajectory. Middle class and wealthy families have historically supplemented their children's school learning with enriching extra-curricular learning in the afternoons, evenings and weekends spanning sports, the arts, the world of work and other interest areas. Given the breadth and depth of this extra-curricular learning, and the

impact it has on the student's overall knowledge, skills and dispositions, there is a growing movement to think differently about education versus learning. The school building used to have the market cornered on learning, and it was assumed that it was where someone "got educated." Now, there is a blurring of the lines between formal and informal learning. In the US state of Nevada, policy was passed within the past few years where 90% of the learners per pupil allocation go directly to the family to determine how they might spend it, rather than 100% going directly to the school district, as is the case in most places now. That raises all kinds of questions around how we think about learning. In the US state of Colorado, an initiative called ReSchool is asking different questions about life paths and learning, with a set of emergent prototypes testing how informal learning could supplement or replace formal learning environments like school. Over the past five years, the MacArthur Foundation has grown an initiative called the Hive Learning Network. The Hive attempted to formally network informal learning among non-profit organizations and businesses focused on the arts, youth development and entrepreneurship. Over time, this expanded from Chicago and NYC to a set of cities around the world. It has continued to grow into a relatively new initiative, LRNG, across 12 American cities, with a focus on interest-driven learning that is available anytime/anyplace through an online platform. Another notable component of the work is what LRNG calls verifiable and credible learning through badges that have currency at school and in the workplace.

This move toward a broader ecosystem of learning is another important trend that will begin to impact educator learning. For too long, professional development has been a monolithic domain, where learning was slated to happen during a few annual in-service days and at district-wide professional learning sessions. Now, learning is moving toward interest and need-driven, and will increasingly be democratized as anytime, anywhere. We are closely watching how educator learning can tap into the intrinsic and extrinsic motivations of adult learners alongside a growing range of more flexible currencies that are being developed to verify and credit educator learning experiences, from continuing education credits to badges, graduate credits, and master teacher status through an array of micro-credentials.

Each of these trends not only provides us with a broader context, but also are, of themselves, important data points. As we consider the

educators within our systems, these external forces are impacting them personally and professionally. We need to be aware of their potential and seek to leverage these trends to positively impact how educators learn. The approach we are building and testing leans heavily on these trends because we strongly believe that they are already having noticeable impact, not only on educators but on the future system of learning.

WHY TEACHERS ARE THE CRITICAL ELEMENT

While learning can and should occur broadly, school remains a primary interface of learning for most students. Schools are very complex systems. When we dissect schools, there are a set of component parts that need to work together to optimize the learning for students. Figure 7.4 below provides an illustration of a set of levers needed to *design* and *implement* effective learning models.

As an organization, 2Revolutions has helped support the development of a substantial number of new and transformed school models over the years. While each school model lever is important to the success of a student's learning experience, *educators are the common denominator* and, along with school leadership, are driving most of these design levers

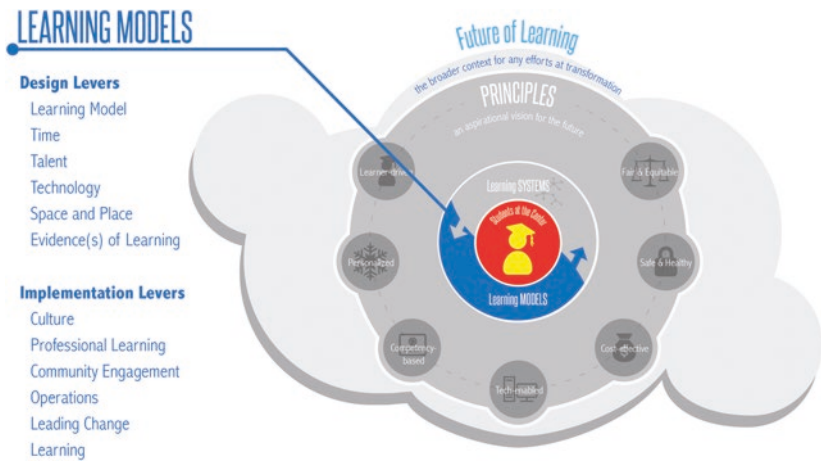


Fig. 7.4 Future of learning design and implementation levers

(learning model, time, talent, technology, space and place, evidence of learning), and deeply participating in—if not driving—all of the implementation levers.

There is a very strong research base squarely pointing to the efficacy of teachers as one of the biggest drivers of student success. A study by the RAND Corporation (2012) on measuring teacher effectiveness found that the biggest school-related factors to student achievement are teachers. We know that the relationships between students and teachers are important drivers for student success (Schieb and Karabenick 2011), and that students' life outcomes, as measured by earning potential, are directly impacted by the quality of their teachers (Hanushek 2011). In fact, the effects of teachers on student learning are not only quite high but are also cumulative and long-lasting. The effects of just one teacher can impact a student's future learning for up to four years (McCaffrey et al. 2003), and potentially even after graduating: when students are taught by high quality teachers, they are more likely to attend college, have higher salaries upon entering the workforce, and save more for retirement (Chetty et al. 2011). Student success, in effect, is highly dependent upon effective educators both in and outside the classroom.

How do we maximize the value of effective educators? What can we do as a system to increase and sustain the quantity of high quality educators? In order to impact learning, at scale, our educators need an improved approach to training and support. It is these adult learners who, when engaged, empowered and supported to learn differently, can leverage that experience to drive real and lasting transformation of student learning. In the aggregate, this represents a significant opportunity for systemic impact.

So, where to invest—pre-service or in-service training? We often find ourselves needing to choose because of resource limitations, regulatory trade-offs or because of what is within our control from our seat within the system. We would argue that it is a false choice. Transformation of both initial teacher education and in-service training are desperately needed. The remainder of this chapter is focused on rethinking in-service training, which we are confident offers some pedagogic and design ideas concepts to transform initial teacher education.

AN INNOVATOR'S GPS: SEEKING A SOLUTION

In order to transform our current systems, we need a framework for finding our way. This framework provides us with a means to situate where we are versus where we are trying to go. The image in Fig. 7.5 illustrates the shift we propose to take. Make no mistake that most organizations exist squarely in the *Now*—our current reality is limited and has diminishing returns. It was created and perpetuated as much by the confines of the regulatory environment as by an array of cultural norms around what professional development was meant to do and how it works for some adults in the system. Meanwhile, we do not have aggregated and well-organized demand for a new and better approach to educator training. We need to understand the limitations of our current situation in order to chart a clear course for the Future. This Future represents spaces ripe for the development of innovations, unburdened by the current systems' limitations. Once we document our *Now* and concretely outline the *Future*, the *Next* is the necessary bridge to help us leap the chasm between here and there. As we outline in this chapter, we build the bridge to the Next atop a core set of design principles. Crossing the chasm to the future is difficult, but the iterative process of learn—experiment—prototype helps us achieve a culture of innovation required for transformation.

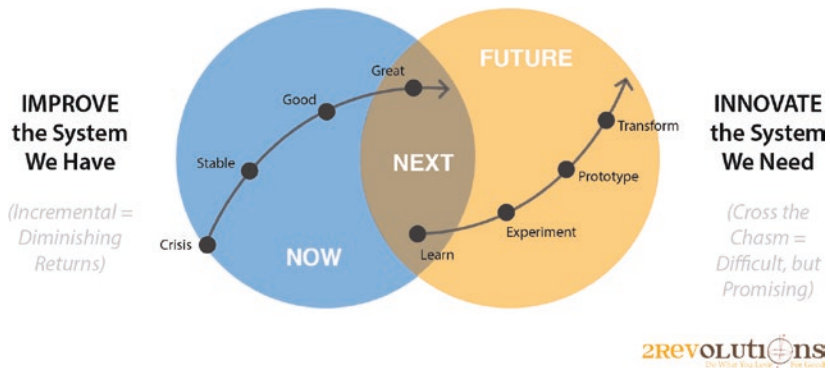


Fig. 7.5 Innovator's GPS improvement to innovation

| <i>Now</i> | <i>Next</i> | <i>Future</i> |
|--|--|--|
| PD is largely passive, inefficient, isolated, and stagnant | Adult Learning that is personalized, competency-based, modular, motivating, relevant, respectful, collaborative, and sustainable | Better outcomes for students; sustainability and well-being for students, teachers and systems |

Now

We should seek to be fellow students with the pupil, and should learn of, as well as with him, if we would be most helpful to him.

—Henry David Thoreau

Today’s approach to professional development for teachers is troubled by many of the complex challenges facing our broader education systems. While there is a great deal about the system that is improving, we would contend that there is much about the current system of educator professional learning that is not working. It is clear that we are spending a tremendous amount of resource on professional learning, with questionable outputs and outcomes. By naming and better understanding these elements, we have an opportunity to make the transition to the future we seek.

In this section, we examine some limitations within the current professional development system related to effectiveness, sustainability, and well-being.

EFFECTIVENESS

While research has already identified what it takes for educator learning to be truly effective, our current situation is a far different reality. The ways in which we currently support educator learning are constrained by significant structural challenges to efficacy. These challenges can be divided into several core problem streams: learning is passive, time is being used in questionable ways, the work is isolated from the needs of educators, and there is an overall stagnancy to much of the training. All of these taken together highlight this cycle of inefficacy.

Learning is Passive: Currently, one of the greatest barriers to effective educator learning is its inherent passivity. In fact, fewer than one in three teachers can choose most or all of their professional learning opportunities, while nearly one in five teachers never have any say in their professional development (BCG 2014). Both pre-service and in-service development often tends to default to the quantity of seat time rather than the quality of active, relevant and job-embedded learning (Dunne 2002). This “one-size-fits-all” approach perpetuates a system of ineffective educator learning. Fewer than one in three teachers choose most or all of their professional learning opportunities. Nearly, one in five never has a say in their professional development (BCG 2014).

Inefficient Use of Time: Even if the quality of the initial experience is high, educator learning is still frequently inefficient because of the limited time dedicated to improving practice. It takes on average 20 separate instances for a teacher to master a new skill (Joyce and Showers 2002), yet a recent report revealed that American teachers receive limited support and lack sufficient time to deeply engage in more effective instructional strategies (Gulamhussein 2013).

Isolated: A report by the Boston Consulting Group (2014) for the Gates Foundation, in which over 1300 teachers were surveyed, found that the large majority of educators do not believe that the professional development they receive is helping them prepare for the changing nature of their work as twenty-first century educators. Educator learning was found to be most lacking around effective use of technology and digital learning tools, accurate analysis of student data for differentiated instruction, and aligned implementation of the Common Core State Standards. However, subject matter is not the only element isolated from their training: current educator learning also lacks collaborative connections to other educators. Over half of all American teachers have never observed a colleague’s teaching (OECD 2014). Without a collaborative, context-based focus in educator learning, significant change in teachers’ practice will not occur (Sturko and Gregson 2009).

Stagnant: A variety of surveys and reports on American educator learning uncovered a systematic network of discontent. Only 29%

of teachers surveyed were highly satisfied with current professional development offerings, and only 34% felt the system of professional development has improved over past iterations (BCG 2014). This dissatisfaction is further substantiated by the fact that the results of educator learning have largely stagnated. For many teachers, professional growth tends to plateau after only the fifth year of teaching; in fact, the difference in evaluation ratings between an average first-year teacher and an average fifth-year teacher was more than nine times the difference between a teacher in her fifth year and a teacher in his twentieth (TNTP 2015). This pervasive culture of low expectations for teacher development and performance prevents educator learning from becoming truly effective.

Additionally, it is important to examine the current range of approaches used in educator training, to understand the perspectives of both teachers and district leadership. In Fig. 7.6, we pull data from the Boston

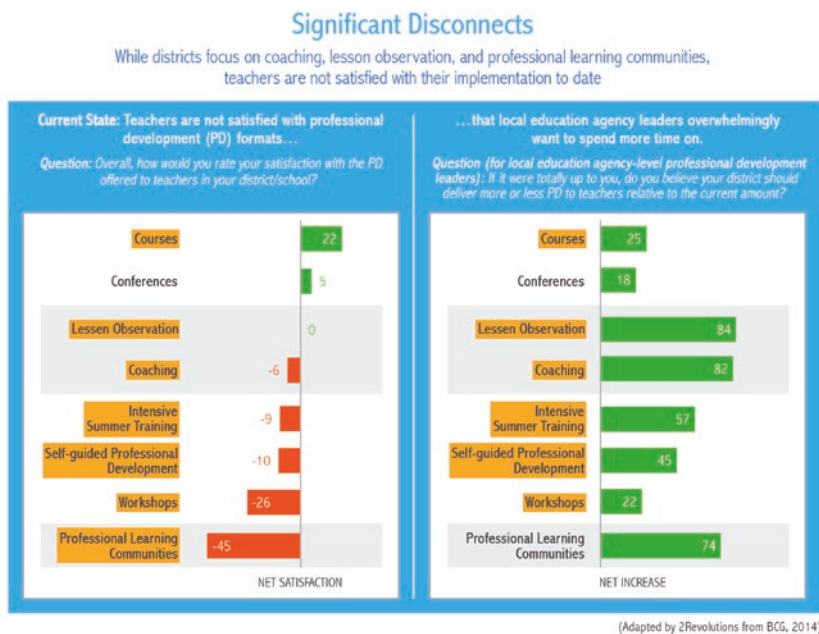


Fig. 7.6 Perspectives on professional learning component parts

Consulting Group study as evidence of educator opinion, as well as a way of examining specific disconnects between the opinions of teachers and system-level decision makers.

In environments where we are working deeply in partnership with state education agencies, school districts and charter management organizations, there is often a lack of coherence between and among professional learning offerings, which creates a significant disconnect for the educators and contributes to the lack of efficacy in the training. All of these data point to a missed opportunity for impact with the educators.

Sustainability

When we consider the importance of this work, the potential for impact and current expenditures against the need, there is a tremendous disconnect, especially when one considers the hefty resources—both in time and money—expended for educator learning.

- Professional development is big business. In 2014, approximately USD 8B was spent on professional development in the 50 largest districts within the US alone (TNTP 2015). Estimates range, but some put the annual costs of K-12 professional learning in the US at USD 18B/year (BCG 2014).
- A typical teacher spends 68 hours each year—more than a week and a half—on professional learning activities typically directed by districts. When self-guided professional learning and courses are included, the annual total comes to 89 hours (BCG 2014).
- High quality, personalized professional development, such as a mentoring program, is linked to increased teacher retention (Darling-Hammond et al. 2009). When teachers feel that they have opportunities for growth, their sense of efficacy and competency increases, making them more motivated to remain in their current position (Huang and Cho 2010).

Given the return on investment demonstrated by the data detailed above, questions about the current system persist and deepen. But beyond the direct impact on student learning, these expenditures also raise questions about broader issues of sustainability. Are we growing and retaining a future-ready workforce? Are we not only developing the individuals themselves, but also being mindful of the rapid developments

in the field and the need for these professionals to stay relevant amidst tremendous change, as the work and the context in which the work happens (e.g., rapidly evolving student populations) continues to shift?

Around the world, there have been breakthroughs in educator learning in many high-performing countries, shown by the rates at which greater teacher satisfaction and efficacy are frequently correlated to higher levels of student achievement (OECD 2014). Nevertheless, these systems of professional learning are still a work in progress, based on self-reports and external analysis, particularly in high-needs schools across the globe. Additionally, educators in a diverse range of countries often highlight a “support gap” (OECD 2014) in their collaborative professional development, demonstrating significant room for growth that could well benefit from real innovations in educator learning.

In order to transition from the current state to the *Future*, and for our system of professional learning to work better at scale, there is the need to empower teachers as owners of their learning while acknowledging that the school principal and district leadership have necessary responsibilities and important perspectives that need to be taken into account.

NEXT: CROSSING THE CHASM

What I hear I forget, what I see I remember, what I do I know

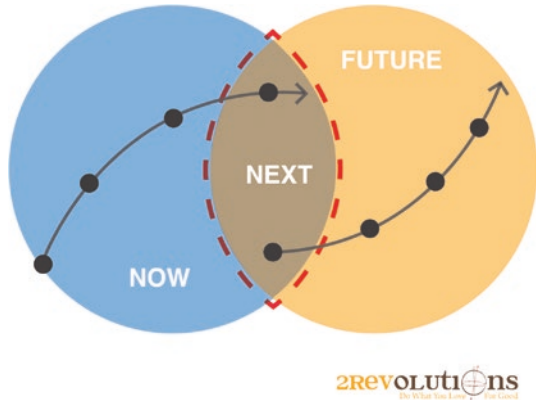
—Xunzi

How do we cross the chasm between *Now* and *Future*?

There is a bridge, built upon a set of core design principles, informed by a set of theoretical frameworks around learning. These frameworks focus on the development of skills, knowledge, and dispositions, respectively. When we think about these frameworks and leverage them in a more integrative fashion, rather than in isolation from one another, we substantiate the argument for and the feasibility of the approach outlined for educator learning in the *Future* (Fig. 7.7).

Picking up on clear themes from the *Now*, we begin with the premise that educators are largely underserved by the value of the learning opportunities available to them. This is a point about the process and structure of the learning. While we also take issue with the content, which often is perpetuating more traditional approaches to instruction and assessment that are less effective with growing populations of more

Fig. 7.7 Crossing the chasm to the future



diverse learners, in the context of this chapter, we strongly believe that by addressing structural challenges around the process of educator learning, we can yield real shifts for students, teachers and systems.

In this section, we outline a set of constructs for skill, knowledge and disposition development. In the *Now*, a limitation that we identified is that we start with skill development or knowledge development as a point of entry for educator learning. Taken by themselves, these are good but insufficient for the *Future* we seek. Rather, there is the need to more effectively integrate these points of entry; we need a more intentional and significant approach that is about knowledge, skill, and disposition development. It is through this approach that we will be able to span the breadth and depth of the chasm, in order to support a transition to the *Future*.

The professional learning system itself can and should serve as the induction into a new way of teaching and learning, by engaging educators in experiences that model innovative and integrative approaches to teaching and learning. This new system begins with dispositions as foundational and builds knowledge and skills atop those dispositions.

Much emphasis has been placed on knowledge development in education writ large. There is common agreement among educators and researchers that the ability to flexibly transfer conceptual understanding to various real-world situations is the hallmark of knowledge (Wiggins and McTighe 2005). Expanding on Bloom's Taxonomy, Webb's Depth

of Knowledge enables us to calculate cognitive depth by categorizing learning tasks across four levels of cognitive demand: recall and reproduction, skills and concepts, strategic thinking, and abstract thinking (Webb 1997). While knowledge is indispensable to the educator's professional learning, it is insufficient in shifting practice. The development of educator skill must also be prioritized.

There has been much recent emphasis on deeper learning competencies, such as Michael Fullan's "6 C's" as part of the New Pedagogies for Deeper Learning (Fullan and Langworthy 2014). The Center for Innovation in Education introduced research-based developmental progressions for collaboration, communication, creativity, and self-direction in the Essential Skills and Dispositions Framework (Lench et al. 2015). Teaching methodologies such as a project-based learning at High Tech High, New Tech Networks, and Big Picture Learning have gained great traction among educators, but questions remain about how to ensure that content and skill are adequately developed alongside deeper learning competencies. Moreover, effectively supporting educators in implementing methodologies such as these, when many educators themselves have not experienced learning this way remains a critical question. Beyond these questions remains a larger one: *what is the impetus for educators to significantly shift their practice when so much remains unknown?*

Research on growth mindset and human motivation underscores the essential role of dispositions in learning and development. Carol Dweck's distinction between a growth and fixed mindset reveals how influential our own views on intelligence and talent are on our potential for continued learning (Dweck 2007). Daniel Pink's research reveals how influential autonomy, mastery, and purpose are in motivating us and points the way beyond traditional rewards and punishments to achieve the highest human potential (Pink 2009). John Hattie's Eight Mind Frames contextualize growth mindset within education and specify particular educator dispositions that correlate to the most positive impact on student learning (Hattie 2012).

In order to make a shift, we advocate a different approach to professional learning—one that begins from the perspective that educators have a unique set of needs. They are first and foremost adult learners; therefore, they both learn differently and require an approach that honors and builds from their life and work experiences. Rather than treat them monolithically, there is the need to acknowledge that they have different needs and are on a continuum in their knowledge and skill development.

Thus, there is the need to establish a different way to support them and their learning.

This approach is one that should be more grounded in andragogy (from the Greek *andra* meaning “adult” and *agogus* meaning “leader of”) versus pedagogy (from the Greek *paid* meaning “child” and *agogus* meaning “leader of”). Malcolm Knowles (1992) asserts the logic that adult learners have a fundamentally different set of needs, and therefore, pedagogy as a driving assumption for educator learning misses the mark. In Fig. 7.8, Knowles offers a comparison between andragogy and pedagogy.

In this context, comparing pedagogy and andragogy raises real questions as to how our future system of educator learning ought to work. It also forces us to reflect on what kind of professional will better meet the quickly evolving tasks at hand. In the current system, research illustrates that professional learning is often more passive, compliance-oriented, and extrinsically motivated. Reframing the learning opportunities through a lens of andragogy provides a new and different way to structure and support learning opportunities for our educators, first and foremost beginning from the premise that they are adults with a rich set of knowledge and experiences.

Do we want our educators to be dependent or self-directed learners? Do we want them to be a repository of information or generative learners leveraging their own experiences to deepen students’ knowledge and understanding? What role do their own problems of practice play in their learning versus theoretical constructs too often disconnected from real needs they have in their classrooms?

| Assumptions | | |
|----------------------------------|---|---|
| ABOUT | PEDAGOGICAL | ANDRAGOGICAL |
| Concept of the learner | Dependent personality | Increasingly self-directed |
| Role of the learner's experience | To be built on more than used as a resource | A rich resource for learning by self and others |
| Readiness to learn | Uniform by age-level & curriculum | Develops from life tasks & problems |
| Orientation to learning | Subject-centered | Task- or problem-centered |
| Motivation | By external rewards and punishment | By internal incentives and curiosity |

(Adapted by 2Revolutions from Knowles, 1992)

Fig. 7.8 Pedagogic vs. andragogic assumptions

We would strongly contend that the kind of educator we want maps clearly to the kind of system of learning we now need for students. As economies shift and demands on the labor market change with greater frequency, our societies need learners to be more versatile, evolving from a focus on a certain type of content knowledge to a set of transferable dispositions and skills. Content knowledge matters, especially at a foundational level for students, but as a student matures, that content is more accessible today than ever before through a wide range of accessible sources. Understanding what you need, where to find it, and how to apply it is far more valuable in our knowledge economy than being a knowledge repository in and of itself. Therefore, these shifts clearly need to help guide our system of professional learning for educators.

If we prepare and improve our educator learners through a new and different approach that privileges the individual and moves toward demonstrable learning versus seat time, by virtue of their training, we are likely to imprint them with a more nimble and responsive model for their teaching. Therefore, the import of educator learning is multi-fold—it has direct impact on learners and it builds a more successful and sustainable model for the educator learners, all of which contributes to greater educator wellbeing.

As we consider a more integrative approach that blends knowledge, skills, and dispositions, an evolved system of educator learning emerges. This new approach requires a set of guiding design principles, supported by the theoretical research base outlined in this section. It is these principles that provide the bulwark from which we can build a more effective system of educator learning. Moving forward, we believe that professional learning should be:

- ***Personalized***: Targets the unique needs of each educator within their practice rather than one-size-fits-all professional learning.
- ***Competency-based***: Begins by establishing an understanding of what educators know and can do rather than teaching to the middle. It also advances an educator in their learning based on demonstrable mastery of content, as evidenced by shifted practice within the classroom. Mastery correlates to achievement, which represents a departure from professional learning based on seat time.
- ***Modular, not Monolithic***: Breaks the complexity of learning into a set of component modules. This allows for personal focus on areas of need or interest rather than a broader topic in which the

educator may have already mastered some of the content or their context may have shifted and the additional content is no longer relevant.

- **Motivating:** Acknowledges the need for intrinsic and extrinsic motivation for participants, that there is clear encouragement for educators to want to learn. The motivations extend beyond a short-term compliance exercise, clearly linked into the career pathway, whether this incorporates badges, graduate credits or a focus on mastery with an opportunity for different job responsibilities.
- **Relevant:** Meaningfully aligns with school- and district-wide efforts rather than a set of learning activities disconnected from one's direct areas of focus (classroom and/or school). This ensures that the professional learning is an integral part of the work at hand rather than something that is external and, therefore, not directly relevant.
- **Respectful:** Treats people like professionals by honoring the expertise they bring, their unique context, and their learning style. It gives people choice in what they do anchored to interest and need, when they do it, and how they are assessed. All of this can yield significant improvements in both efficacy of the work and satisfaction with the process.
- **Collaborative:** Leverages the power of groups as appropriate to push one's thinking, promote learning together, and benefit from different skill sets and dispositions. Collaborative professional learning is as much about the individual as the collective. Additionally, because of the power of technology, there are opportunities that can happen to facilitate collaborations across a school building, around a district or across broader areas.
- **Sustainable:** Significant amounts of money are spent on professional development in most systems. There should be attention paid to the outcomes and how it contributes to professional growth as evidenced by student outcomes, teacher retention, teacher satisfaction, and wellbeing.

These principles must be informed by the research but anchored in a local, contextualized vision for student learning. Local context matters deeply and should be the driver for the construction of the *Next*.

FUTURE

Every person of learning is finally his own teacher.

—Thomas Paine

Imagine a scenario in which each adult learner was respected as a professional, met where they are in their learning journey, and supported from that place to further stages of their development. This scenario mirrors the kind of learning we want our students to experience: learning that is personalized, relevant, and geared to students' current levels of learning, while pushing them to their learning edge. In Fig. 7.9, we provide a framework for this future-oriented process in which educators experience a new kind of learning.

The approach, outlined above and detailed in the following section, represents a way to realize this vision, with the clear belief that educators need to experience learning in a way that intentionally integrates the



Fig. 7.9 Anchoring in adult learning theory

knowledge, skills, and dispositions they need to be effective and grow their prowess as practitioners.

There are clear stages of this learning process. While made up of distinct elements, for this to work over time, the essence of the work is integrative, not linear. In this section, we will detail the following stages: *Engendering Ownership*; *Personalized Learning*; *Competency-Based Learning*; and *Shifting Beliefs*.

Engendering Ownership

Most educators are drawn to their work by a mission to help students learn, which is a significant intrinsic motivator. Educator learning is motivated by mission, but amidst the real and persistent challenges of the work, there is the need to maintain and deepen this motivation over time. The importance of motivational psychology is vital to the learning process. Simply put, if there is no motivation to learn, then there is no learning (Walberg and Uguroglu 1980). There is a real need to engender ownership in the learning process. Educators who feel included and in control of their learning are more likely to be involved and active in their development (Wlodkowski 2008)—thus building educator agency is critical to the long-term success of the effort. This is further underscored by Knowles' work on andragogy detailed earlier in the chapter and evidence of greater success in the classroom when teachers reported having more agency in their learning (BCG 2014).

To do this work effectively requires an authentic process whereby educator voice is meaningfully engaged to help inform their learning, as well as more broadly shape the context in which they work. This approach helps to make their learning feel relevant to them.

A few key activities in this phase include:

- *Visioning*: It is important to lead with invitation rather than edict. Educators all work within an existing context, which has a culture and a set of expectations, norms, and pathologies. Rather than divorce these from the learning, which happens far too often, there is the need to anchor the work within that culture, so as to better understand it and position learning within it, which will help promote real sustainability in the work itself. Key elements of visioning include:

- *Student attributes*: What are the key attributes (knowledge, skills and dispositions) of successful learners upon completion of their learning at your school?
- *Learning principles*: In order for students to embody these attributes, what needs to be true about your learning environment and the qualities of the student learning experience? What are words that capture these characteristics?
- *Barriers*: What are obstacles that are getting in the way for you in realizing this vision for learning at your school?

This activity provides an opportunity to be clearer as a team about the direction you want for your school, anchored in a co-constructed idea of what student success looks like. Figure 7.10 provides an illustration of one school’s vision. The vision serves many purposes. It acts as a guidepost by setting a clear target at which to aim. It models communication and collaboration in action. It also provides a tangible opportunity for educators to help inform the outcome of their work more broadly, spurring self-direction, and empowering them as drivers of their work—rather than passive vessels who only carry out directives without the ability to shape them.



Fig. 7.10 School vision artifact

All learning is contextual and personal. By inviting educators to inform their environment, there is an opportunity to anchor their professional learning against the mission of their work, thereby activating and orienting their disposition toward continued learning and development.

- ***Problems of Practice***: Out of the visioning process comes a clear sense of barriers. These self-reported challenges are analyzed and discussed. What is preventing the realization of the vision—at the level of individual and the collective? That which emerges here helps drive the development of problems of practice. These problems translate into demand-driven, relevant learning opportunities, aligned with the unique needs of the individual and/or groups of teachers. There is the need to evaluate problems and validate them as credible and pressing barriers to student learning; building on Harvard’s Instructional Rounds, it is important to leverage peer and leader feedback to ensure problems of practice meet a core set of criteria reflected in Fig. 7.11 (City et al. 2009).
- ***Communities of Action***: A set of clear trends emerge from the analysis yielding common problems of practice. Around these common problems, there is an opportunity to form action-oriented educator collaborations whereby teams work together to learn by

Draft Problem(s) of Practice

Now combine your personal interests/aspirations with the priorities and/or barriers you just identified to draft one or more (but no more than 3) problems of practice to focus your continued learning.

HOW CAN I INCREASE STUDENT INTRINSIC MOTIVATION, AS EVIDENCED BY INCREASED ENGAGEMENT IN LEARNING TASKS AND PERSISTENCE IN THE FACE OF CHALLENGE?

Refined Problem(s) of Practice

Now review your draft problem(s) of practice against the following criteria. Ideally, gather feedback from at least one other colleague or coach as well.

- **Relevant**: Related to work you're already doing or something you need to work on
- **Connected**: Has a connection to the larger school vision and priorities
- **Central**: Focused on the instructional core - the interactions between the teacher, students, and content
- **Actionable**: Specific, time-bound, and controllable enough for you to take on
- **Observable**: Grounded in some kind of evidence so you can see improvement and share results
- **High-Leverage**: If you can act on the problem, it would make a significant difference for student learning

Fig. 7.11 Problem of practice artifact

doing. These communities of action, akin to more traditional professional learning communities, are time-limited and anchored in an improvement science methodology of short-cycle prototyping—addressing a clear problem of practice, with a hypothesis to be tested and a course of action that by design, is meant to quickly test, learn, and refine in order to improve practice. Through this process, educators come face to face with knowledge and skills gaps. Figure 7.12 illustrates an example of the short-cycle prototyping process that 2Revolutions uses to support teams in problem solving within a Communities of Action context.

Personalized Learning

Once we have identified areas of need, a set of topics will emerge as areas of focus for the Communities of Action. Before teams can dive into testing approaches, there is the need to build knowledge and skills. This is where personalized learning meets individuals and teams.

Each learner establishes a *Personal Learning Plan* that captures their unique needs, grounding the learning experience in their background, interests, working/learning style, and an inventory of their dispositions. With a better picture of the learner, we have an improved chance of meeting educators' needs and fueling their intrinsic motivations to learn.

Individualized *coaching* provides each participating educator with someone to help them manage their learning plan and provide ongoing feedback and validation of their learning. The coach role is intended to provide consistent supports to aid educators in achieving their personal learning goals. Coaches challenge educators to embrace and manage the

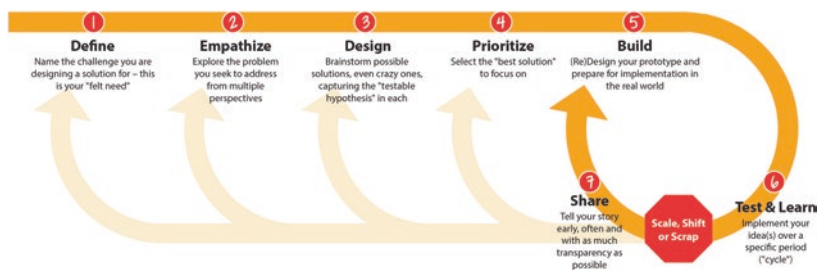


Fig. 7.12 2Revolutions' short-cycle prototyping process

moments of discomfort that naturally occur in the change process and establish the relationships necessary to support educators at the edge of their learning. Based on their detailed knowledge of each adult learner, coaches orchestrate a variety of supports based on their coachees' specific learning needs. Coaching supports can come in the form of access to relevant learning resources, modeling, co-planning, co-teaching, observation and feedback, and more. Designated coaches need not serve as the sole provider of professional supports to their coachees; technology-enabled on-demand learning can and should be leveraged in service of learners. As long as adult learners experience a coherent continuum of supports anchored in their personalized learning needs and there is clear communication across all providers in alignment with these needs, expertise can be channeled from multiple sources.

A continuum of topical *adult learning progressions* meets the learner where they are and asks them to self-assess their current abilities across a continuum of performance indicators from Invested to Developing, Leading and Innovating. See Fig. 7.13 for an artifact of an adult learning progression around Tech-enabled Learning. Once the learner self-assesses, they can access *topical playlists* aligned to relevant learning progressions. These playlists provide leveled learning resources that learners can read, watch, or listen to in order to increase investment in various competencies and build relevant knowledge and skills. In a wide-ranging partnership, we have just recently released a compendium of high quality, free educator learning resources accessible through <https://getinspired.2revolutions.net/external/signup>.

All of these approaches are personalized because they work within the context of the unique educator, allowing them to work on content relevant to their work and taking into account their prior knowledge when providing opportunities for knowledge and skill development. Each educator is able to access the content most relevant to them and move at a pace aligned with their learning needs and style.

COMPETENCY-BASED LEARNING

Making the shift from knowledge to skill development requires authentic demonstrations of learning in practice. Understanding a map of the competencies and the continuum or progression on which those competencies exist developmentally is critical. While there are a number of high quality sets of competencies available to pull from

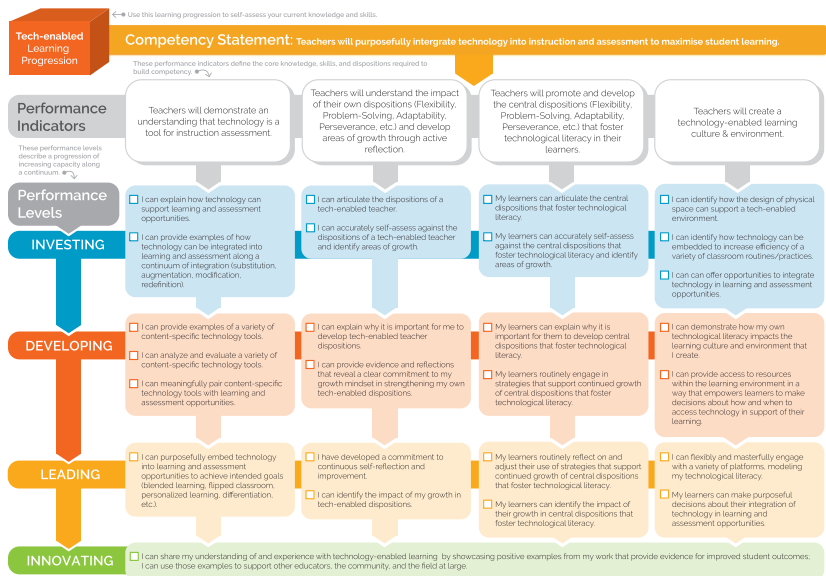


Fig. 7.13 Adult learning progression artifact

(including rich work on more next generation competencies by Jobs for the Future in 2015), this competency development work needs to be anchored to the local context and take into account what the evolving teacher role needs to know and be able to do. In a competency-based context, the output from learning is privileged above actions of learning. Therefore, evidenced-based validations of educator-specific competencies are the aim.

There are a deeper set of more interactive learning opportunities available through topical *micro-credentials*. These learning experiences provide participants with the chance to demonstrate their knowledge and skill acquisition for credentials, based on the presentation of clear evidences of learning. An educator is able to take a micro-credential learning experience online, which allows them to make variable their pace and place of learning. Participants can take a full micro-credential or just move directly to a formative assessment, which will ask them to present clear evidence of shifted practice within the classroom, through

relevant artifacts and explanation. This can include student work, video documentation, or some other clear demonstration of learning. As an educator wants to go deeper into a topic, there are “stacks” of multiple micro-credentials, which provide greater depth and allow for demonstrable knowledge and skill development.

Additionally, beyond the demonstrations of learning are opportunities for deeper reflection on practice through an ongoing dialogue with a coach aligned with one’s personal learning plan. These plans are living documents with both the educator and the coach going back and forth around knowledge, skills, and disposition development.

The move toward competency-based learning is a significant shift away from measuring time-based learning opportunities, which more often than not had the feel and efficacy of a compliance-based exercise.

SHIFTING BELIEFS

One of the last pieces to fall into place is beliefs. Beliefs are the hard-wired cultural elements underpinning one’s practice. Training and support, while critical is insufficient until there is ownership over one’s learning and evidence of real and lasting student performance shifts. When you run an effective process of adult learning, that embodies the design principles derived in the *Next* section of this chapter, you are building capacity to shift beliefs.

PROMOTING SUSTAINABILITY AND WELLBEING

Rethinking how educators keep growing in their practice through ongoing professional learning represents a significant lever to drive the transformation of systems. This process also offers an opportunity to promote sustainability and wellbeing more broadly for students, educators, and the system itself.

Sustainability represents greater efficiency in the use of resources, which promises doing more with less and extending the impact of efforts. With a more innovative approach to educator training in the *Future*, there is an opportunity for significant savings in how we spend time within the system and the value of the time we do spend. There are also significant opportunities for economic efficiency in terms

of the amount of resources spent on professional development and the return on investment of those resources. Beyond the quantitative measurements of time and money, there are both qualitative and quantitative data that we care about deeply such as the ability to attract and retain talent in the sector, thereby promoting greater sustainability for schools and learning models. Each transition of staff has significant economic costs, as well as costs on culture with the loss of institutional memory, cohesiveness of staff, and continuity of relationships between adults and students. There are also opportunities for greater sustainability that can come from reinvesting savings from ineffective and inefficient professional learning experiences to more student—facing expenses.

When we consider how this work contributes to the well being of individuals, there are myriad benefits from rethinking professional learning. For the educators, research provides substantial evidence that happier, more engaged, more respected people have higher rates of job satisfaction across industries (Revesencio 2015). They feel more connected to the work they are doing and will do it better. Retention is higher and opportunities emerge for clearer career pathways to stay meaningfully engaged while afforded the opportunity to play a variety of roles which deepens one's personal investment and maintains interest. The derivative benefits of wellbeing are better professionals who are more motivated to do right by students and more skilled to execute against those desires. Students benefit from this new reality as the recipients of better teaching and learning. As educators have more of the experiences of the learning environments that are better for students—in terms of content, skills, and dispositions—the residual benefits for students will be seen in more dynamic, student-centered learning environments where the focus will shift to a broader definition of student success.

As we see in much of our work, dysfunction trickles down from systems to educators to students. Ultimately, in addition to educators and students, by rethinking professional learning in the ways we have outlined, we have a greater probability of actualizing the kind of transformation we want for student learning. Systems themselves become more sustainable and culturally stronger, healthier places. By anchoring professional learning in respect and professionalism, there is an opportunity to reset the very tenor of how systems work.

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CHAPTER 8

Four-Dimensional Education for Sustainable Societies

Charles Fadel and Jennifer S. Groff

INTRODUCTION

The rate of change in our lives today has pushed us to evolve and adapt our daily practices so quickly, that if one does not pause to reflect on them, it is easy to overlook just how much our world has changed. The past 50, 20, and even just the past 10 years has produced deep and profound changes in our world. Just 20 years ago, many educational systems were under intense scrutiny for not being effective and/or equitable for all learners. Many educational systems were not up to par—and to think, that was before these global dramatic shifts. The call and demand for radically improved, but more poignantly, *refocused* educational systems have never been higher. What does it mean to prepare young learners for a life in today's world? What do they need? What do we value? How can we deliver that? These are complex yet critically important questions to the future of education.

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Today, each of us faces a highly complex, rapidly changing world that affects our lives at a local level. The way we communicate, do business, even interface with our doctors and government officials is altering. Entire industries are deeply impacted by new technologies that continue to arrive at a rapidly increasing pace, with once long-held traditional job skills being phased out—leaving a growing generation of people to ask how they are to make a living. Our world is not as we once knew it, and the change has only just begun.

In this chapter, we will explore the impact of these global changes on the society, human development, and ultimately the core structures of an educational system to lead us forward in the twenty-first century.

OUR VUCA WORLD

In the twenty-first century, humanity faces considerable changes at many levels. As a global community, we are in the grips of the collective crisis of climate change, a problem with deeply complex variables, as we continue to explore possible solutions that impact all aspects our way of life, both personally and globally. We are now all too familiar with the interconnected instability of our global economy, and how the rapidly shifting nature of core industries, new technologies, cultures, and demographics in part due to foreign and domestic conflicts only threatens that stability further.

The winds of change have become fast and strong. The complexity of our interconnected nature of our world only continues to grow, giving us a VUCA world—a trendy acronym short for volatility, uncertainty, complexity, and ambiguity. It’s trendy because it aptly captures many of the challenges facing us today. In a VUCA world, there are many interconnected parts and variables; there may be information available, but it may be difficult or overwhelming to process. The complexity makes causal relationships not clear, leading to “unknown unknowns”.¹ This makes the problem unstable and possible solution actions unclear and uncertain.

As businesses, industries, and societies increasingly face these types of challenges, the question asked by all is, “*How can we better prepare learners for this world?*” And now, more urgently than ever, *humanity is searching for its sustainable future.*

PREPARING LEARNERS FOR A WORLD UNKNOWN

Yet despite these dramatic global shifts of the past few decades, education systems still have not seen dramatic change. There are many aspects of educational reform pursued today that were initiated before the 1980s, including improving early literacy development, equity and access, personalization and meeting all learners needs, and more. Yet even putting all those aspects aside, most of the educational systems are not able to prepare learners for a VUCA world because they have not fundamentally questioned and redesigned *what* is to be learned throughout their course of education. While “the three R’s”² are important, they are just a small piece of what learners will need to be able to adapt and thrive in a complex, dynamic, unknown world.

In most developed countries, the general curriculum is still modeled after the Harvard “Committee of Ten”³ curriculum from 1893—a curriculum developed in response to the sudden growth in societal and human capital needs. Yet our world today bears little resemblance to that of the nineteenth century. In the complex, ambiguous world of today, where we cannot predict the needs and challenges 20 years from now, we must rethink how we prepare today’s learners—and that must start with *redesigning the curriculum for what humanity presently values for its future*.

REDESIGNING THE CURRICULUM FOR TODAY’S WORLD

Preparing learners for a complex, dynamic world means going beyond just preparing for the basics. Over the past decade, we have seen a growing realization and consensus on this in education, as many constituencies have advocated for the integration of “21st Century Skills,”⁴ also commonly known as the “Four Cs”⁵ into the general curriculum. Unfortunately, as many educational systems subsequently found, simply aiming to infuse these skills into the existing curriculum has proved challenging and ultimately not able to produce the outcomes desired for a number of reasons, but foremost because the structure of the existing general curriculum was not able to effectively accept and support these skills and outcomes. Moreover, preparing learners for the unknown world of tomorrow requires going beyond just the “Four C’s”. In short, it requires a fundamental reconceptualization and redesign of the core curriculum.

How do we fundamentally redesign the curriculum for today's, and tomorrow's, world? This has been the driving question of the Center for Curriculum Redesign (CCR),⁶ an international NGO who has partnered with global organizations to lead this work. Through this collaborative work, we have developed guiding tenets to answer such a question and ultimately a framework to inform the redesign of curriculum.

TENETS OF A TWENTY-FIRST CENTURY CURRICULUM

In our now complex and ambiguous world, a fundamental redesign of the general curriculum to prepare learners for an unknown future can itself be an ambiguous challenge. Therefore, to guide this work, we have developed several tenets based on analysis of current dynamics and trends that help shape our thinking of redesign:

Adaptive. The curriculum must be fluid and evolving; able to more easily adapt and respond to emerging trends and needs in the world so that it stays current and dynamic over time. If a curriculum is not adaptive, it becomes rigid. There is no such thing as a perfect curriculum that does not need updating, because the world continues to change and the goals of an optimal curriculum changes with it. Moreover, it must be able to take place outside of the classroom and virtually, on computer screens, from anywhere in the world. Increasingly, learning is going beyond the school walls, and learners must be enabled to move through the curriculum in all modalities.

Balanced. When trying to make sense of our complex education needs, the immense variety of perspectives on the conditions of education today, and the plethora of theories and practices related to learning, it is not uncommon to fall victim to a mindset of false choices, such as: "Which is better?"—teaching knowledge, or teaching skills? Should education focus on the humanities, or on science, technology, engineering, and mathematics (STEM)? Should schools develop character qualities or help students pass important high-stakes tests? These arguments push and pull the curriculum into unhealthy dimensions unable to support all learners and learning goals.

Flexible. While the curriculum must be able to adapt to a rapidly changing world, it also must be able to be flexible to individual learner interests, needs, and goals, as well as local needs at the classroom and community level. As such, the curriculum cannot be overly prescriptive or directive.

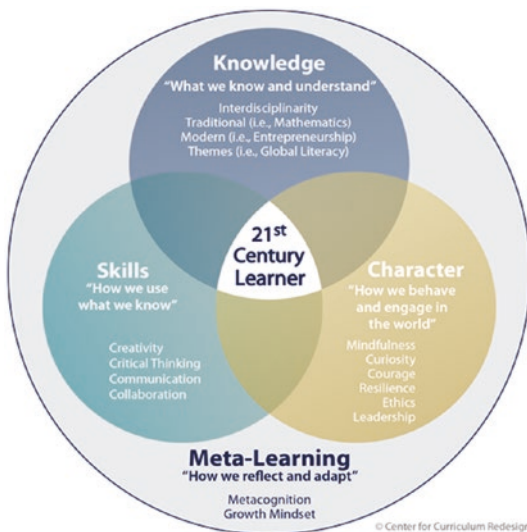
THE FOUR DIMENSIONS: FRAMEWORK FOR A TWENTY-FIRST CENTURY CURRICULUM

Curriculum, as it is traditionally conceived, consists mostly of content knowledge that students must learn. In the modern world, progress is adding more and more pieces of knowledge at faster and faster rates, piling onto students' already overburdened plates. According to E.O. Wilson, "We are drowning in information, while starving for wisdom. The world henceforth will be run by synthesizers, people able to put together the right information at the right time, think critically about it, and make important choices wisely".⁷

A deep curriculum redesign requires exploration through all dimensions of knowledge, skills, character, and meta-learning competencies. These are outlined in the CCR framework⁸ below (see Fig. 8.1).

Knowledge. Though a core pillar of any curriculum, content knowledge can no longer be the sole central element of a curriculum's structure. The misalignment caused by too strong of an emphasis on content knowledge is evidenced in many ways today, including lack of real-world relevance that manifests in low student engagement and motivation. Traditional subjects (Maths, Language, etc.) are of course essential,

Fig. 8.1 The foundational framework of the Center for Curriculum Redesign



but must be a part of the means to an end in terms of larger individual competencies. Additionally, traditional disciplines must be augmented by “modern disciplines” such as Robotics, Entrepreneurship, Biotechnology, and many more. Tough choices must be made about what to pare back in order to allow for more appropriate areas of focus; for instance, in Maths, today’s world demands a stronger emphasis on statistics and probabilities, and less on trigonometry (first heavily emphasized due to the large demand for land surveyors). Likewise, choices about content knowledge will also need to be made around the concomitant depth that it is able to cultivate with the other three dimensions of the framework (Skills, Character, and Meta-Learning).

As a result, *interdisciplinarity* is viewed as a strong binding mechanism for traditional and modern disciplines alike, and the practices these disciplines require for the Skills, Character, and Meta-Learning dimensions. For example, new interdisciplinary fields that are already relevant to tomorrow’s world may be Robotics, Biosystems, Social systems, Wellness, Entrepreneurship, Media, Journalism, etc.

Skills. Key “higher-order skills” such as the “Four C’s” are essential for deeper learning of content knowledge, as well as for being able to demonstrate understanding through performance.⁹ As discussed earlier, there is a reasonable global consensus on what critical Skills are at the broadest level,¹⁰ and how different pedagogies can affect skills acquisition. Yet the current amount and structure of content in the curriculum, as well as a lack of support for educators to be able to implement robust pedagogies for these deeper learning experiences, has largely kept these Skills out of everyday learning experiences. A curriculum redesign must look at how to situate these Skills with the Knowledge, Character, and Meta-learning competencies desired.

Character.¹¹ We use the term Character to refer to how we engage in the world. Character education is about the acquisition and strengthening of virtues, values, and the capacity to make wise choices for a well-rounded life and a thriving society. In order to engage and thrive in an increasingly challenging world, and support the positive growth of civic society, Character is a crucial structure in a redesigned curriculum for the twenty-first Century. This is true for one critical reason: there are ethical and character implications to all of the global challenges we face today (environmental issues, corruption, terrorism, income inequality, and on and on). Likewise, increasingly new and emerging technologies bring with them deep ethical implications (such as cloning, gene-editing,

etc.). As such, Character is a dimension prevalent in many global aspects today. As UNESCO has underscored, “There is every reason to place renewed emphasis on the moral and cultural dimensions of education... this process must begin with self-understanding through... knowledge, meditation and the practice of self-criticism”.¹² Research has shown that students’ capacities, beyond academic learning of knowledge and skills, are important predictors of achievement and can be essential to success in work and civic life.¹³ This includes much of the emerging research on “non-cognitive skills”. While certain knowledge and skills may or may not be used in future jobs, character qualities will invariably be applicable to a wide range of professions and to everyday family and community life.

How does one “unpack” Character in order to build a curriculum framework? There are many constructs and concepts that relate to Character, organized in various ways. In order to facilitate this work, CCR has conducted a systemic review and synthesis of more than 30 of these constructs to ultimately identify and summarize the 6 essential qualities in the CCR Character framework:

Mindfulness
 Curiosity
 Courage
 Resilience
 Ethics
 Leadership

Each of these qualities is a composite of a large number of qualities and concepts,¹⁴ which are discussed in Fig. 8.2.

Meta-learning. In order to deepen and enhance the learning in these three dimensions—Knowledge, Skills, and Character qualities—there is an important additional fourth dimension needed for a fully comprehensive twenty-first century education: meta-learning (often called learning to learn or the internal processes by which we reflect on and adapt our learning). It is not enough to implicitly include this fourth dimension in all the other dimensions—its significance must be highlighted explicitly, so that we are constantly reminded to incorporate meta-learning strategies into the knowledge, skills, and character portions of our learning experiences, learning how to strive to improve no matter what goals we set for ourselves.

| Essential Qualities | Associated Qualities and Concepts |
|---------------------|---|
| Mindfulness | wisdom, self-awareness, self-management self-actualization, observation, reflection, consciousness, compassion, gratitude, empathy, caring, growth, vision, insight, equanimity, happiness, presence, authenticity, listening, sharing, interconnectedness, interdependence, oneness, acceptance, beauty, sensibility, patience, tranquility, balance, spirituality, existentiality, social awareness, cross-cultural awareness, etc. |
| Curiosity | open-mindedness, exploration, passion, self-direction, motivation, initiative, innovation, enthusiasm, wonder, appreciation, spontaneity etc. |
| Courage | bravery, determination, fortitude, confidence, risk taking, persistence, toughness, zest, optimism, inspiration, energy, vigor, zeal, cheerfulness, humor etc. |
| Resilience | perseverance, grit, tenacity, resourcefulness, spunk, self-discipline, effort, diligence, commitment, self-control, self-esteem, confidence, stability, adaptability, dealing with ambiguity, flexibility, feedback, etc. |
| Ethics | benevolence, humaneness, integrity, respect, justice, equity, fairness, kindness, altruism, inclusiveness, tolerance, acceptance, loyalty, honesty, truthfulness, authenticity, genuineness, trustworthiness, decency, consideration, forgiveness, virtue, love, helpfulness, generosity, charity, devotion, belonging, civic-mindedness, citizenship, equality, etc. |
| Leadership | responsibility, abnegation, accountability, dependability, reliability, conscientiousness, selflessness, humbleness, modesty, relationship skills, self-reflection, inspiration, organization, delegation, |
| | mentorship, commitment, heroism, charisma, followership, engagement, leading by example, goal-orientation, focus, results orientation, precision, execution, efficiency, negotiation, consistency, socialization, social intelligence, diversity, decorum, etc. |

Fig. 8.2 Essential qualities of character (Source *Center for Curriculum Redesign*)

Perhaps, the most important reason for developing metacognition is that it can improve the application of knowledge, skills, and character qualities in realms beyond the immediate context in which they were learned.¹⁵ This can result in the transfer of competencies across disciplines—important for students preparing for real-life situations where clear-cut divisions of disciplines fall away and one must select competencies from the entire gamut of their experience to effectively apply them to the challenges at hand. Transfer can also be necessary within a discipline, such as when a particular idea or skill was learned with one example, but students must know how to apply it to another task to complete their homework or exams, or to a different context. Transfer is the ultimate goal of all education, as students are expected to internalize what they learn in school and apply it to life.

CCR's Meta-Learning framework is composed of:

Growth Mindset: Positing that talents and abilities can be developed through effort, good teaching, and persistence. This directly relates to Carol Dweck's work at Stanford University.

Metacognition (including Reflection): "Awareness and understanding of one's own thought processes". Metacognition is essential for activating transference, building expertise, and establishing lifelong learning habits. Metacognition for learning, often called "learning to learn", involves the learner reflecting on all three of the key learning processes in the CCR framework as they perform these learning tasks: gaining knowledge and understanding, building skills, and developing character qualities.

Redesign for a Modern Curriculum

Developing a modern curriculum with this framework as a guiding frame will require a fundamental redesign. Why redesign? Education has traditionally taken the approach of *reform*—identifying one or more aspects that need improving and inserting programs or policies to improve those aspects. However, in a complex system, these interventions and attempts at incremental change generally don't have deep impact because complex systems adapt or push out small interventions to maintain the status quo. In the case of curriculum, we can see this with the tweaks and modifications made over the years to integrate new elements such as higher order skills or twenty-first Century Skills. These may then show up in some

way in the classroom, but overall classroom practice for deeper learning really has not changed.

In order to develop and provide today's learners with a modern curriculum, one that prepares them for our VUCA world, requires a deep and fundamental *redesign* of all aspects of the curriculum—most critically, because *these four dimensions can't just be added in and taught independently from one another*. These four dimensions cannot be identified and taught in isolation as elements of knowledge; for in doing so, a learner may gain some intellectual understanding of them but will gain no ability to meaningfully apply them to their life and the real world. Rather, these four dimensions must be deeply interwoven to create robust learning experiences. In short, a modern curriculum can no longer be linear tables of knowledge and some skills that students must be exposed to at certain grade levels—a modern curriculum must be richly interwoven in a way that reflects the complexity of today's world, where Knowledge is a vehicle by which Skills, Character, and Meta-learning are experienced, integrated, and applied.

The Role of Themes

Crosscutting themes are an important tool that has long been used in curriculum design in order to achieve such goals of integration. Themes represent common strands of learning that run through many of the disciplines—traditional and modern—and which matter to many jurisdictions and cultures. There are a number of key themes that are relevant to our modern world, and must be learned as interwoven into Knowledge disciplines:

Global Literacy: understanding the interconnected nature of our global community, as seen from multiple perspectives.

Information Literacy: facility in developing an informed orientation in a landscape of data, able to evaluate source credibility, and a dynamic position able to remain open to new evidence.

Environmental Literacy: understanding of the environment and the circumstances and conditions affecting it, including society's impact on the natural world, and the skills to investigate/analyze these issues and problem-solve within this domain—*critical to a sustainable humanity*.

Digital Literacy: facility with modern digital tools when working in a spectrum of domains.

Systems Thinking: facility in the nature of types of dynamics and properties of complex systems.

Design Thinking: facility with the processes and approaches of design when tackling a problem.

ENABLING A TWENTY-FIRST CENTURY CURRICULUM TODAY, FOR A SUSTAINABLE TOMORROW

The urgency to provide a meaningful and effective education for all has never been greater. In order to do that, we must fundamentally rethink what learners need, and as a result, fundamentally redesign core structures of our education system. Inherently, this requires that first and foremost start with the curriculum. To this point, historical inertia has largely been *the* deciding factor when it comes to curriculum design—i.e., “that’s how we’ve done it before”. We can no longer allow this to continue. To change policy at the system level, most countries face political life-cycle instabilities that make it hard for systems to innovate in an ambitious way. Similarly, many curricular decisions are made by subject-matter experts—e.g., math decisions are made by math experts—in relative isolation from the demands of the real world (and the users of the discipline itself), and thus tend to take an incremental, isolated approach.

John Dewey proposed that “education is the work of supplying the conditions which will enable the psychological functions to mature in the freest and fullest manner”.¹⁶ The framework presented offers a comprehensive construct to begin the redesign process and overcome this inertia. As our world continues to expand and transform in unpredictable ways, facing complex challenges with unknown solutions, it is only through preparing our youngest citizens today, do we have the hope of a sustainable future. Deep, meaningful learning experiences *for every learner*, around global themes that cultivate critical skills, awareness of one’s self, and the character necessary to navigate complex, ethical challenges are key to our global sustainability.

In a rapidly changing world, it is easy to get focused on today’s requirements, needs, and demands. Yet adequately preparing for the future means actively creating it: the future is not the inevitable, or something we are pulled into. There is a feedback loop between what the future could be and what we want it to be—we must deliberately choose

to construct the reality we wish to experience. We may see global trends and their effects creating the ever-present future on the horizon, but it is up to us to choose to actively engage in co-constructing that future.

NOTES

1. Bennet, N., & Lemoine, G. J. (2014). What VUCA Really Means for You. *Harvard Business Review*. Available at <https://hbr.org/2014/01/what-vuca-really-means-for-you>.
2. A term used to refer to reading, writing and arithmetic.
3. Knowledge discipline standards in secondary education in the United States were first established in 1893 by the Committee of Ten, led by Charles Eliot, the president of Harvard University and sponsored by the National Education Association. He convened ten committees of education experts, led mostly by college presidents and deans, and charged them with defining the standardized curriculum requirements for all public secondary schools.
4. Per Trilling, B., & Fadel, C. (2009). *21st Century Skills: Learning for Life in Our Times*. See <http://21stcenturyskillsbook.com>.
5. A term used to encompass a varying number of skills, but often considered at the very least the “Four C’s”: *Communication, Collaboration, Critical Thinking and Creativity*.
6. For more information, see www.curriculumredesign.org.
7. Wilson, W. (1999). *Consilience: The Unity of Knowledge*. New York: Vintage, p. 294.
8. <http://curriculumredesign.org/our-work/four-dimensional-21st-century-education-learning-competencies-future-2030>.
9. The Conference Board’s “Are they really ready to work?”; AMA “Critical skills survey”; PIAAC program (OECD).
10. www.oecd.org/site/piaac/mainelementsofthesurveyofadultskills.htm.
11. Just as for “Skills”, there is no perfect word that covers all meanings of “Character” in all languages; for instance, it may be “personality” in some. So, by “Character” we mean all of related terminology such as: “Agency, Attitudes, Behaviors, Dispositions, Mindsets, Personality, Temperament, Values”. CCR objects to the use of the improper “non-cognitive” or “soft skills” and much prefers the OECD’s use of “Social and Emotional Skills”.
12. UNESCO. (1996). *Learning: The Treasure Within*. Report from the International Commission on Education in the Twenty-First Century.
13. For a review, see Camille A. Farrington et al. (2012). *Teaching Adolescents to Become Learners: The Role of Noncognitive Factors in Shaping School*

Performance—A Critical Literature Review. Consortium on Chicago School Research.

14. For more information on these Essential Qualities and the synthesis that produced them, see Fadel, C., Bialik, M., & Trilling, B. (2015). *Four-Dimensional Education: The Competencies Learners Need to Succeed*. Center for Curriculum Redesign.
15. Schraw, G., & Moshman, D. (1995). Metacognitive Theories. *Educational Psychology Papers and Publications*, Paper 40.
16. Dewey, J., as cited in Kohlberg, L., & Hersh, R. H. (1977). Moral Development: A Review of the Theory. *Theory into Practice*, 16(2), 53–59.

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CHAPTER 9

Creativity, the Arts, and the Future of Work

Linda F. Nathan

INTRODUCTION

As long as there have been futurists and science fiction writers, there have been predictions that the future would deliver a world without the drudgery of work and with more leisure time and personal freedom for all. Whether the “age of technology and the machine” (Burton 2015) will ever be realized is unclear. Nevertheless, society faces a central challenge of how to better prepare young people for an uncertain future where progress and opportunity—social, economic, and environmental—cannot be assumed.

Education, on some level, contributes to “the common good, enhances national prosperity and supports stable families, neighborhoods and communities” (Pellegrino and Hilton 2012). However, this statement assumes there to be a linearity between the present and the future. I believe that in order to prepare students for the future that is unfolding now, an educational approach that incorporates creativity and arts-based learning is critical to developing resilient, adaptive citizens that can build the stable families and communities of the future.

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This chapter asks a central question about the role of creativity and arts education: how can this emphasis contribute to a more sustainable society and even the future of work (Hellstrom et al. 2015)? How do artists think about creativity and how might schools do the same? I consider an educational case study of the Boston Arts Academy and describe teaching and learning at this one institution. I explain how an intensive education in the arts prepares students with passion to engage an uncertain future, even if they have fewer advantages than most American students. My concluding remarks emphasize the essential qualities of persistence, passion, and practice for success in life and work.

THE FUTURE OF WORK

A growing body of literature by philosophers, economists, social scientists, and technologists foretell futures of work that crowd around two distinct outcomes: a dystopia of extreme polarization or an Eden of creativity and cultural production (Brynjolfsson and McAfee 2016; Thompson 2015; Sundararajan 2015).

The practice of work happening in a single place for a fixed period of time has entirely eroded for many professionals today. The workplace can span states, continents, and time zones. With new technologies and digital collaboration tools, co-workers can meet both synchronously or asynchronously no matter where they are located or their preferred working hours. These realities reflect both a demand for more work flexibility and a broader transformation of how we work. Today's entrepreneurs want to decide how "they should define and tackle specific problems and tasks, and when and where work should be done" (Ake Ouye 2011). Couple this with the pressure for greater sustainability, companies now manage workplace design, commuting patterns, air travel practices, greenhouse gas emissions, and food service as part of their operations portfolio. And this trend seems to be increasing as younger workers demand more flexibility in work schedules and alternative workplaces (Hellstrom et al. 2015).

With these trends in the workplace, what are the implications for the future of work and the skills needed for future workers? Clearly, workplaces need to distribute the settings where work is conducted. The notion of a *Central Office* must evolve and respond to the diversity of needs and include ways to support collaboration. As the workplace has become more diffuse, the challenge of keeping workers engaged,

focused, and connected to mission and vision becomes more problematic. With less daily face time, how do people stay connected? If workers are spread out geographically, work practices need to adapt. Even though workplaces and work itself may be changing, social skills such as empathy, cooperation, communication, and flexibility remain in high demand. Employers want a workforce that understands how to persist with tasks and learns to communicate both up and down hierarchies, as well as laterally with colleagues. Finally, every employer wants workers who understand how to problem-solve.

As these developments disrupt the workplace, public education systems have largely not kept pace, or have even been included as part of the conversation. Post-secondary education is nearly unaffordable for large segments of the population in the United States. Yet the mantra “College and Career Readiness” was a rallying cry and effectively federal policy during the Obama Administration. Nevertheless, *career readiness* was a muted tagline as doubts increase that a college degree will prepare graduates for their future careers, or more fundamentally, that they will be as prosperous as their parents. With respect to the uncertain and ambiguous future of work, coherence and direction is lacking in educational policy.

LOOKING TO THE FUTURE THROUGH CREATIVITY

The Partnership for 21st Century Skills posits that *The 4Cs*: Communication, Collaboration, Critical Thinking, and Creativity are the central skills and dispositions that all students must master to be successful in our increasingly complex world (Partnership 2010). An education centered in creativity and the arts may hold promise for such a twenty-first Century approach to teaching and learning.

In their seminal book, Hetland et al. (2013) describe a series of eight studio habits of mind that they observed in various schools and programs with strong visual arts curricula. They identify the habits that artists—and arts teachers—tend to employ as:

1. **Develop Craft:** Learning tools, materials, and artist’s practices.
2. **Engage and Persist:** Learning to pursue topics of personal interest; develop focus, ways of thinking to persevere.
3. **Envision:** Picturing, imagining what cannot be observed.
4. **Express:** Creating works that convey ideas, meaning, or emotions.

5. **Observe:** Learning to view visual, audio, and written resources more critically.
6. **Reflect:** Learning to think and converse about one's work and processes of making.
7. **Stretch and Explore:** Learning to stretch beyond perceived limitations, explore, and learning from errors or accidents.
8. **Understand Art World:** Learning about art history and artistic practices and engaging the arts community.

The habits provide insight into the ways arts teachers teach and art students learn, and are not necessarily linear or hierarchical. The first habit, development of craft, involves learning about technique, understanding artistic conventions and the use, practice, and care of materials as well as the organization of studio space. Another habit refers to learning about art worlds beyond the classroom such as art history and artistic communities of practice such as galleries, curators, and critics. The six remaining habits, which are seen in serious and high quality visual arts classes, involve general cognitive and attitudinal dispositions towards learning. These six habits are also used in many daily activities as well as various academic pursuits. Causal research about success in the arts and the relationship to success in academic endeavors is still needed, yet current research suggests that the development of artistic habits of mind supports students' interests in innovation (Winner et al. 2013).

The Hetland et al. research is further supported with studies by Eliot Eisner (2002). These scholars demonstrate how the arts help students develop flexibility, expression, and the ability to shift direction (Hetland et al. 2013, p. 7). There is clear evidence that arts learning is not just an "emotive" discipline but one that requires deep reflection and intellectual rigor. In my own work (Nathan 2009), I describe how we teach the arts not so that students will get better at other subjects such as math (the now debunked "Mozart effect"), rather we teach the arts because they are necessary for enabling their maximum personal development. The arts are a critical part of a young person's education because they are vehicles for instruction about tolerance, diversity, and the importance of human understanding. In my experience, as our students develop these studio habits of mind, they tend to achieve more success in school and in life outside of school—a finding which will be demonstrated with a case study later in this chapter.

The literature on imagination also supports the importance of creativity and the arts in education. In socio-emotional studies, imagination involves the ability to envision a productive future, and take steps to become the person you want to be in that future (Killingsworth and Gilbert 2010). Young people who are immersed in an education system that values and promotes creative and critical thinking will rise to demand what even they did not think possible. Over my many years, as a faculty, school leader, and teacher, my colleagues and I debated how to define creativity and imagination. In the end, we knew both mattered and we experimented with many different curricular innovations with our students to expand the opportunities for creative and critical thinking through the arts. Yet the question persists: what is creativity and how do artists and designers understand its significance to their work?

WHAT IS CREATIVITY AND WHY IT MATTERS

Architect and author Kyna Leski describes creativity as “...a storm that slowly begins to gather and take form until it overtakes you—if you are willing to let it” (Leski 2015). And later, “...the quality of making, inventing, or producing—rather than imitating—and it’s characterized by originality and imagination” (Leski 2015, p. 29). In this way, Leski depicts creativity as a form of problem solving.

Philosopher and psychologist Mihaly Csikszentmihalyi characterizes creative processes as a state of *flow*—which he describes as a state of concentration or complete absorption with the activity and situation at hand. *Flow* is another term for the sense of being *in the zone* or *in the groove*. Incidentally, people tend to be most happy in this flow state where they are neither too challenged (a source of anxiety) nor too bored.

Csikszentmihalyi described flow as “being completely involved in an activity for its own sake. The ego falls away. Time flies. Every action, movement, and thought follows inevitably from the previous one, like playing jazz. Your whole being is involved, and you’re using your skills to the utmost” (Csikszentmihalyi 1990, 2004). While Csikszentmihalyi doesn’t use the precise word creativity, I believe his definitions echo Leski’s description of creativity. He describes how when “a person’s mind or body is stretched to its limits in a voluntary effort to accomplish something difficult and worthwhile,” wonderful moments and outcomes can occur.

Playwright and actor Melinda Lopez described how she achieves flow in a keynote for the National Artist Teacher Fellowship in 2015:

I have always made plays. I started writing because I wanted to know what I had to say. It is a process of intense isolation in writing and intense collaboration when in rehearsal. I see it like preparing to run a marathon. I have to do a little bit every day. Then, I will get there. I can't find equilibrium if I don't write.

For Lopez, writing requires large chunks of unstructured time to move fluidly between thinking and writing. She writes that during this time, she won't be available for others, she may not eat regularly, and that she tries to take a walk because the physical activity helps her focus. Indeed, many artists talk about how ideas come to them when they are in the shower, or taking a walk, or even right after waking up. But during this time, she is typically not very good company for her family: "And they understand that. They know this is my profession." She also described the power of giving her writing away; losing control of something she worked so hard to perfect. That is what a playwright does and is common in so many creative pursuits. Someone else will direct her work and act in her play. Her words, therefore, must stand on their own.

Lopez defines creativity in much the same way as the others: "Creativity is a muscle that responds to training and practice and discipline." I would argue that this is precisely the view that should be commonly held in school systems (i.e., the opportunity for creativity must not be a special event, but a common practice—a condition).

Lopez added one more insight: "I believe we can be creative in microscopic particles." The meaning of this statement is not immediately obvious. However, I take it to suggest that creativity is often thought of as a trait only some people possess. And that if they do, it is overwhelming, virtually constituting their entire identity. Lopez is proposing the opposite: that all people have access to creativity, even if it is only fleeting.

As a school leader, I have worked to imbue the power of art making as a strength that can be translated into other arenas. Once a student has done one thing well and successfully, we have seen that the student's ability to achieve more is increased. We teach that success begets more success. Our arts-based curriculum enables students to effectively

communicate with others and understand or empathize with events or social issues of our time. As a result, we see our students continually willing to take on new and more difficult challenges. Artists, perhaps more than others, can embrace mistakes. As Ornette Coleman, the jazz musician said, “When I found out I could make mistakes, that’s when I knew I was on to something.” Traditionally, schools have eschewed mistakes; students learn only to find the one right answer. But this approach not only limits a student’s access to creativity and imagination, it can limit learning.

CREATIVE ARTS AT WORK

In Boston, Massachusetts, Mayor Martin Walsh has initiated a city-funded program called Boston AIR (artists in residence) to integrate artists in residence into City departments. The goals are two-fold: first, to support the creation of great art and second, to explore urban challenges in new and innovative ways. The program is based on the assertion that creativity and the arts can help bring new perspectives to solve seemingly intractable urban problems of violence, racism, substance abuse, and blight. Five City departments: Boston Police Department, Neighborhood Development, Parks and Recreation Department, the Office of Women’s Advancement, and the Office of Recovery Services will have the opportunity to learn and grow alongside *their own* artists in residence. In 2016, ten artists were selected and funded from a large pool of applicants. The resulting process of artists and city departments learning together to expand their own civic and social activities has transformative potential. As Mayor Walsh explained, “Boston AIR (Artist in Residence) is just one of the many ways we’re working to invigorate Boston’s cultural scene and support local artists whose innovation and creativity can benefit the people of Boston.”

One selected artists from the first cohort (2015) was violinist Shaw Pong Liu. Her proposal, *Time to Listen*, experimented with ways that collaborative music-making can create a different kind of time, connection, and space for healing and dialogue about the difficult topics of gun violence, race, and law enforcement practices. She worked with the Boston Police Department as well as two local not-for-profit youth organizations to model innovative approaches to police-to-community dialogue on gun violence and race.

The notion of embedding artists into various city departments in order to elucidate social issues has precedent. Mierle Laderman Ukeles became the first artist in residence in New York City's Department of Sanitation in the 1970s. The impetus for her performance art work was New York City's sanitation workers who were largely invisible to the rest of the city's population. The City's residents expected clean and uncluttered sidewalks, but had little idea about who was actually doing that work. Ukeles' art focused on sanitation workers and how they lived in order to challenge the negative stereotypes associated with sanitation as a process and the workers who carry out the challenging work. A brochure, advertising her unpaid employment in the department from 1979, states "Public Art with Public Workers in Public Spaces for the Whole Public." In her first year in residence, Ukeles shook hands with each of the 8500 sanitation workers across the five boroughs and thanked them for the work they did keeping New York City clean. She also interviewed many and recorded her conversations in order to create an exhibition called "Touch Sanitation" (Kastner 2002). Ukeles could, through art, express some of the frustration felt by sanitation workers who believed that the public perceived them to be part of the garbage. Her work began to change public perceptions by revealing the nexus of waste, culture, visibility, and power. "After the revolution, who's going to pick up the garbage on Monday morning?" she asked.

What is new in Boston's AIR program is a commitment to integrate people with diverse perspectives and skill sets into one City department and to provide a \$22,500 stipend to each artist. By allocating funds for this work, the city acknowledges the important role that creative endeavors can have in working to solve society's most difficult challenges. The prospect of a musician, visual artist, and quilt maker as well as a video artist charged with helping to solve problems, both large, and small, can appear unorthodox. Yet supporters of these programs believe that this way of working holds the secret to a sustainable future. As Ukeles said, "Public art can create permeable membranes between the inside and outside of systems, spaces, and even the souls of citizens. Public artists need more breathing space to experiment and do R&D. They need to be brought in at the very inception of projects, so they can do their first work as a certain kind of thinker" (Kastner 2002). By embedding the Boston artists early on in departmental projects, the results may be as stunning and surprising as Ukeles' enduring work.

CREATIVITY AND THE FUTURE OF WORK

David and Tom Kelley, the founders of IDEO, an international design and innovation firm, insist that creativity is not limited to artists and designers. As with Lopez and others, they stress that creativity is like a muscle that must be continually exercised or it will atrophy.

The Kelleys describe phases of creativity they have observed in the workplace; the first phase being most important: one must *choose* creativity (Kelley and Kelley 2013). This involves tolerating ambiguity when you are not certain you are on the right path. A creative orientation means one will take risks and accept failure as part of an innovation process. One must confront obstacles when they arise and redefine problems in new ways in order to seek innovative solutions. They suggest ideas such as “think like a traveler” which may allow you to adopt a mindset of seeing things as novel, or from a child’s eye. “Think like a traveler” acknowledges the importance of learning from different cultures or organizations and from people quite different from those you are accustomed to. They also stress the importance of “engaging in relaxed attention.”

Daydreaming, or being at relaxed attention, runs antithetical to much of the current educational literature about “grit” (Duckworth 2016; Perkins-Gough 2013) and much of the re-emerging “no-excuses” movement in education reform. As educational psychologist Mary Helen Immordino-Yang and her colleagues wrote, “rest is not idleness” (Immordino-Yang et al. 2012). We must help young people (and educators) realize that often our brains can make the largest cognitive leaps when we are not obsessed with solving a challenge, but we are resting or allowing our thoughts to meander. Since we engage in imaginative daydreaming for many of our waking hours, it’s important to understand the connection between imagination and creativity (Killingsworth and Gilbert 2010). That is when we can generate new ideas and solutions. Creativity does not exist without imagination (Davis et al. 2004). Cognition is associated with attempts to empathize: how do we imagine the perspective of another. If we agree that a critical twenty-first Century skill or global competence involves the ability to generate questions and seek answers about the world, take others’ perspectives, communicate with different people, and address societal issues, then we must develop deeper understanding of the connections between imagination and creativity (Boix Mansilla and Jackson 2013).

The Kelleys helped to introduce an approach called Design Thinking, which is both a practical and creative approach to problem solving and product development. Design Thinking emphasizes a series of iterative steps beginning with empathy or seeing the experience through the end-user's perspective. The next phases have to do with generating a proposal and refining a product: define, ideate, refine, test, and prototype. Unlike other problem solving approaches, Design Thinking, through its emphasis on empathy as well as divergent thinking, strives to generate more future-oriented, human-centered solutions. Although the future of work may demand creativity, it is the most under-developed and ignored skill in most of our schools.

Within respect to schools, an understanding and application of Design Thinking could greatly enhance our approaches to teaching and learning. Without empathy, students cannot deeply understand a new context or issue or begin to think through how to make sense of new information. If we want schooling to prepare young people for the ambiguities and uncertainties of the future of work, putting arts learning and creativity at the center of education may be just the approach we need. Arts-based learning enables students to develop the very skills that futurists say we need most: *persistence* (learning how to practice and commit to something through many revisions), *collaboration* (working together on a play, a music ensemble, curating a gallery show, choreographing and performing a dance), *communication* (making sure everyone in the ensemble or cast knows what's going on, at what time, and how the action or event will flow), *critique* (being able to distill what one likes/doesn't like in a piece of work, helping others grow from criticism, connecting the work to those that came before—in other words, on whose shoulders do you stand?), and *resilience* (the capacity to recover quickly from difficulties or even toughness).

LEARNING WITH THE ARTS: A CASE STUDY OF BOSTON ARTS ACADEMY

Boston Arts Academy (BAA), a school that I founded in 1998, is Boston's only visual and performing arts public high school. There are 440 students in grades nine through twelve (secondary school). Over 65% of students receive free and reduced lunch, which is the federal government's indicator for families living at or below the poverty level (about \$44,000 for a family of four). The school is about 40% African

American, 44% Latino or Hispanic, and 13% Caucasian and about 3% Asian American. About 16% of the students are considered in need of special education services and have an Individualized Education Plan. Many are also considered English Language Learners (they speak a language other than English at home). While these demographics reflect the city of Boston, most Boston Public high schools are often much poorer and with fewer Caucasian students than BAA. One of the hallmarks of BAA is its socio-economic and racial diversity. Another remarkable characteristic is its high college acceptance rate at 94%. In a recent study, 63% of our graduates had either finished college within six years or the more recent were still pursuing higher education. The national rate for college graduation in the United States hovers around 56% and is much lower for students of color or from low socio-economic backgrounds.

Auditions are required for enrollment at BAA and no academic tests are considered for admissions decisions. In other words, students are accepted based on their passion for the arts. Since they will spend a minimum of two hours per day learning a specific arts discipline (music, dance, theatre, or visual), it is critical that they want to be there. While not all schools can select students based on passion, I have long argued that we would better serve our young people entering secondary school if we required that they begin to articulate what they want to learn and why (Nathan 2009, 2017; Robinson 2015). This is often called career and technical education, but it need not be that specific. If students had to think and write and reflect upon their dispositions towards learning, and their passions, before entering secondary school, I believe much of their first year would be an exploration into possibilities rather than feeling like a cog in a big wheel over which they have no control. Similarly, if all students were given multiple opportunities to ask and examine what they wanted to learn, attitudes towards schooling might improve, especially for students who feel disconnected from and alienated by school.

BAA is part of a movement of schools called Coalition of Essential Schools (www.essentialschools.org) that developed in the late 1980s based on the work of TheodoreSizer (Sizer 1984, 1992, 1996). More recently these ideas have been renamed “deeper learning” (Martinez and McGrath 2014). The premise and research to support these approaches suggest that when students are given opportunities to engage in projects over time, to take risks, to fail, and recover, significant improvements occur in critical thinking and communication skills. These skills have strong correlation to cognition and thus, achievement in school.

Increasingly, research points to schools that teach students to adopt a “growth mindset,” will also lead to stronger academic success. This mindset is a belief that intelligence is not fixed but something that can grow and change over time (Dweck 2006). I will discuss this more below.

BAA specifically teaches a set of four dispositions towards learning. These habits of mind we call the Habits of the Graduate. They are: *Refine, Invent, Connect, and Own*. The terms, and the way they are taught and used, mirror much of the deeper learning literature and also reflect theories underlying a growth mindset. The habits are not taught or used in a particular order, yet the power of these dispositions allows students to become more independent, self-aware, and confident learners. These habits coordinate easily with the dispositions that futurists say we most need for work success and in an uncertain future. In order to *Refine* a piece of academic or artistic work, you must possess both resiliency and persistence. Students ask: “have I conveyed my message? What are my strengths and weaknesses?” Although sometimes the process of *Invent* happens alone, it is often an outgrowth of collaboration. Through working deeply with others, new ideas can emerge. Students ask: “what makes this work inventive? Do I take risks and push myself?” *Connect* and *Own* link to the ability to communicate and to both give critiques and be critiqued. To better understand *Connect* students ask: “who is the audience and how does the work connect? What is the context?” And for *Own*: “am I proud of the work I am doing? What do I need to be successful?” These habits align easily with the same habits required of the twenty-first Century workforce.

Certainly, more schools today emphasize collaboration and group projects, but the very “grammar of schooling” (Tyack and Cuban 1995), or the way the day and classes are structured has not changed much in 100 years. For the most part, students are not exposed to the kind of thinking and ways of working that they will use just four or eight years later. Fortunately, this is not the case at BAA. While emphasizing the attainment of academic skills, students must complete lengthy and long-term academic and creative projects.

The most remarkable part of a BAA education is the Senior Grant Project, which students begin in their junior year (11th grade). They must define a project, which benefits a community, and then bring their artistic and academic skills to bear to constructively address that problem with a project design. They must first show empathy and understanding. Some examples include: how to help young cancer survivors through

music; working with homeless teens through developing short plays that reflect their challenges; developing engaging marketing materials for after-school programs that would raise awareness and hopefully more funds. Some students have worked with community policing to develop programs that better engage young people in resisting gang involvement. The list of projects is long, and the requirements are specific and stringent. Students must complete a letter of intent that demonstrates that they understand the challenges involved with *addressing* the particular problem they want to influence. They must develop a feasible budget, and they must get buy-in from the organization they will work with. Finally, they must demonstrate how both their academic and artistic skills are put to use in working on their challenge. I believe most adults would struggle with projects of this nature.

The requirements of the project position students to think and act like entrepreneurs, but also as artists and collaborators. They need to deeply understand the organization for which they plan to provide services. They begin to learn about philanthropy through practicing grant writing. In creating a budget, they also learn about asking for in-kind resources. Most importantly, students learn how to convince others of value they can provide. And, of course, given the fact that the project evolves over a couple of semesters, students practice sustaining interest and attention. These are all skills that are essential for the future.

At the end of the project, community partners, alongside teachers, are invited to judge both the written work and the quality of the presentations. This creates a level of engagement and authenticity rarely available with papers or tests. The opportunity to have one's work exhibited in this public manner, often in front of people who are decision makers in the community, raises the stakes to demonstrate a high level of mastery. In addition, students work to develop persuasive and creative presentation skills—all skills that are critical to an entrepreneurial approach to work. All students must receive a passing score on their grant project to graduate. About 25% of students receive actual funding to complete their project.

RAUL'S SENIOR GRANT PROJECT

Raul was a percussionist at BAA who proposed teaching drumming to homeless men for his Senior Grant Project. Raul wrote, "There are many innocent people who are left on the streets with no money and no

chance of work. I have chosen to work with this community of people because I have many ties to people in this situation....” He went on to describe how, after his sessions teaching drumming at a local homeless shelter, he would perform a street drumming concert at a public park with his adult students so they could collect money.

During his final review with outside judges, Raul was asked if he felt that drumming could help alleviate homelessness. His answer was thoughtful. “I’m not trying to get rid of homelessness. That has to do with poverty and lots of other things. I want to teach community drumming so that these men do not have to resort to begging for change.” He went on:

Drumming comes from the heart, and I believe if you connect to your heart in honest ways, that could help you get off the street. I grew up with drumming and it helped me get here and get to this school. I think I can show other people that drumming can bring you peace and a sense of control. I always feel in control when I’m drumming and then I’m not depressed.

When asked about his connection to the homeless community, Raul looked down at the floor, and spoke softly, “My uncle was homeless and also my first teacher. He gave me something that no one can ever take away. I want to give something back to him, even if he never can know what I’m doing.” While the clients from the shelter would keep their own donations, Raul would give the money they raised back to the shelter—which was the same place that had helped Raul’s uncle. He died while Raul was working on his project.

Even though Raul personally connected to his project, he had to refine his proposal more than once to get his writing up to the required standard for acceptance. His persistence was evident as he developed his ideas and thought through some of the critique.

For most of Raul’s career at BAA, he just managed to pass. He was a good drummer, and grew a lot over the four years. However, academically he always did the bare minimum, until he had to do the writing and research for Senior Grant Project. He wanted that project to reflect his respect and love for his uncle, and he cared about the issue he was trying to address. How often in students’ school lives can they use their passions and skills to solve a problem they care about? This level of engagement should exist in more schools.

If all high school students had the chance to perform or exhibit work that reflected *their* deep interests and passions, school would be a place that matters deeply. School could be a place that values creativity.

CREATIVITY IS NOT MAGIC

Teaching creativity, or at least ensuring multiple and varied creative opportunities in the school day, may hold a key to the future of education, schools, and work. We know that creativity is central to twenty-first Century competencies. Creativity shares the stage with flexibility, critical thinking, collaboration, cross-disciplinary thinking, and even the development of courage. These are skills, along with content knowledge, that many have agreed must be incorporated into all classrooms. However, day-to-day practice tends to favor the attainment of content knowledge and push to the background the development of creativity in most classroom settings. Creativity cannot be mastered without content knowledge. In other words, one cannot be creative about *nothing*. Students (and a twenty-first Century workforce) must learn to incorporate a *both/and* approach to learning and working. Creativity must take center stage alongside facts and figures. Although that does not mean developing a test for creativity, education systems must do a better job ensuring that teachers and students have more creative experiences in their PK-12 education. At BAA, creativity is a discipline taught daily, both in arts and academic classes. It is a muscle that is consistently exercised. Students constantly reflect on their own abilities to create. BAA's dance curriculum is a prime example:

As part of the curriculum, dance faculty member, William McLaughlin, teaches an approach he calls "*embodied research*." McLaughlin described the term as:

An inquiry-based process, involving the physical response to stimuli. Stimuli might be in the form of text, music, visuals or movement. Participants respond to the stimuli through gestures, which then become movement studies or phrases and finally a fully choreographed dance. (Notes from workshop of Coalition of Essential Schools in Portland, ME, November 6, 2015)

McLaughlin has worked with his dance students to develop a piece called "Speak." This dance grew from an exploration of themes that

cast members, mostly young men of color, faced growing up in urban America. The student dancers spent early rehearsals sharing stories and experiences about difficult or important moments in their lives such as: the death of a relative, being assaulted by a gang member, a tumultuous break-up of a relationship, or becoming homeless. As students recounted these stories, other dancers responded through gestures. These movement phrases became the basis of the longer piece. The production is set to excerpts from speeches by Martin Luther King Jr. and Robert F. Kennedy as well as the music of Daniel Bernard Roumain. The instrumentation, which is both lyrical and haunting, is a counterpoint to the emotional speeches of the two famous leaders. The percussive action on stage is tense, wildly chaotic, and then symmetrical. The dancers' athletic movements are often in sharp juxtaposition with the text of the speeches. The result is a riveting experience that is both familiar and current since the original stories are universal, yet the piece also carries historical memory and inquiry given the biographies of the two authors. The audience is asked to hold dualities of present day and history, which creates a certain discomfort and level of inquiry: *has anything changed in our world?*

I recount the nature of the dance "Speak" not as a dance critic but to provide an example of the ways in which young people can work to tackle content knowledge through their passions and talents. In speaking with the young participants, whether they were current students or alumni returning to participate in the piece, they revealed how this way of training—as a dancer—had such meaning. A dancer must both own material and connect that material to self and others. The process prepared them for a life of work, creativity, and problem solving. Furthermore, the training in this particular piece, and others like it, allows young people to comment on the realities of today's world and, through movement and suggest how to make changes. The entire cast has committed to dance as a way to keep violence at bay and to bring beauty into the lives of their communities. As young people, they have developed assets that they know are appreciated by others. The experience gives them a special sense of confidence and agency in their worlds. They perform the piece often for others. They talk about their stories of sadness and violence that are reflected in the piece and also through the texts of King and Kennedy. The dancers speak about how learning skills such as dance have opened doors and opportunities for all of them, and also has given them tools of resilience against despair. For these young

people, dance is a way of both understanding the world and contributing to its improvement. Agency, as an education outcome, especially for these at-risk youths is a significant and lasting achievement given the social and economic challenges they will face as young adults.

One of the student dancers reflected poignantly about his skills and disposition learned through dance at BAA:

I work as a driver for the elderly with the bus service. I know how to listen. I know how to be compassionate. Of course, that's the kind of person I am, too. But it's also what I learned as a dancer. You have to listen to others. You have to understand what the choreographer wants you to feel. It's not just a movement. It's also a feeling. I bring that to my work with the disabled and the elderly. I love what I do. And I'm good at it. Maybe you'd call it empathy.

Another BAA dance student spoke about his ability to confront racism and violence, and how, as a dancer he can contribute to the long and ongoing struggle in America for racial justice:

As an African American male, every time I hear those words that [RFK] says about Martin Luther King being shot, I just freeze inside. This is today. That is why #blacklivesmatter is so important. We haven't come so far really. I'm at risk just being a black male. That's why I want to keep doing this piece. I want people to understand that racism and violence will destroy us. We have to make changes. I can start.

Another BAA graduate talks about how his education in dance, and more broadly in the arts (he also studied music at BAA), prepared him for both college and for his current job as a civil engineer:

Being an artist means lots of practice and lots of risk-taking. I have to always put myself out there. It has never been easy. That's the same way I approached my major and my job search. Civil engineering, my major, is all about sitting down and working out problems. I knew how to buckle down from being an artist.

This student then goes on to explain his emerging theory of art and success, which clearly anticipates a future of work very different than the one most students are educated for:

Since art is constantly changing, it makes artists well-adaptable to different situations. As an artist, you never know what can be thrown at you... and in my field and in my job, it's the same thing. You have to believe you can keep learning and doing new things.

In his own words, this graduate is essentially describing a “growth mindset,” referenced earlier in this chapter. The student expands this notion and describes how often solutions come from what he called “going off the grid,” which he reconnected to dance as well:

Often, we can't solve the problem in dance just by doing the same movements. Sometimes we have to find a different movement or orientation to express what we are trying to do. That's the same in engineering. It's not always linear. Being able to adapt is key!

McLaughlin, the BAA choreographer and teacher, understands the conditions necessary to developing an adaptive, growth mindset to be inherent in dance, and embodied research:

So much of our daily lives just uses one small part of our brain—usually that part that we call the rationale part—but in dance, as in most art, we are accessing something else. Of course, we have to have beautiful technique. But we are accessing emotion and finding ways to bring people—the audience—to inquire with us—and not just through thinking, but through emotion. The piece is both deeply emotive and an intellectual journey. We have to do both together.

I believe that connecting to others through emotion and allowing an audience to be swept off its feet holds promise for solving intractable problems—a position that admittedly challenges the past century or more of science-based evolution of social and political systems. It is time for teachers and students to harness and respect the power of movement, art, and creativity to help us all better understand complex issues. Perhaps by going “off the grid,” as the student said, these young men will grapple with issues at a deeper level and have more creative solutions. That is the hope that art inspires. Art helps us solve problems both big and small, and in ways that other disciplines fall short. Art, too, gives these young men, who didn't come from communities with abundant resources, opportunities to experience and influence the world in unique ways. I have witnessed how their artistic skills translate into a world

where work and economic stability is inherently uncertain especially for marginalized populations, and increasingly, for the rest of us.

One could argue that work has become more like pre-school; learning and working together at the forefront of knowledge. And clearly, these young dancers and now graduates embody skills paramount for success in today's world, including sharing and negotiating. According to educator Michael Horn, "Machines are automating a whole bunch of these things so having the softer skills, knowing the human touch and how to complement the technology is critical, and our education system is not set up for that" (Miller 2015). I dislike the paradigm of soft and hard skills because I think it misses the central idea: we all need both skills of analysis and skills of collaboration. But we have strayed too far from this notion, embracing and valuing analytic skills over all else. We have forgotten that without the head-heart-hand connection, as education philosopher John Dewey wrote, we are much more diminished as human beings.

A great deal of debate in the educational literature focuses on the role of so called *non-cognitive skills* in learning and in success in life. The notion of living a dignified life, or having a sense of subjective well-being, is often attributed to how schools, and also community and home life, can teach these softer skills. Researcher and psychologist Carol Dweck has contributed to this discussion of non-cognitive skills through the development of a concept she calls "fixed" and "growth" mindset. Within the construct of a "fixed mindset," individuals believe that intelligence is static. This means that, although one can learn new things, you cannot change how intelligent you are. You are either smart or not smart. People with fixed mindsets do not believe that effort can change intelligence and so they have a very deterministic view of the world. "I'm not a good reader no matter how much I try." Or "Math is always hard for me. I'm no good in math." In contrast, an individual with a "growth mindset" believes that she can always increase her intelligence. As introduced earlier, someone with a growth mindset, sees "effort as the path to mastery," and is willing to learn through criticism and persist in the face of challenges.

It seems to be a simple concept—mindset is not fixed—but the impact of the alternative narrative has been profound. The notion that anyone can have a growth mindset must be a central tenant of education. An education in and through the arts can have strong positive effects on developing a growth mindset as we saw in the description of the dancers' abilities to persevere and imagine alternative possibilities to their lives.

STEAM: PREPARING STUDENTS FOR THE FUTURE OF WORK

One of the ways BAA pursued a long-term commitment to creativity and collaboration was by developing a maker-space. We called it a STEAM Lab. For BAA, the term STEAM emerged from the growing emphasis on STEM fields, but we insisted that Science, Technology, Engineering, and Math, without the Arts, was missing a central organ for survival. In addition, students wanted to explore academic and artistic questions in new ways. Students and faculty questioned how their design skills could evolve with new tools. And how might engineering class expand to include issues students were facing in their lighting or costume design classes? The questions seemed endless.

For example, dancers wanted costumes that would light up on the dance floor. Visual artists wanted to paint with gloves on the walls and have each finger exude a different kind of paint. They also wanted to paint with light emanating from each finger. Their authentic need to solve a technical and artistic problem led them into scientific inquiries that explored new territories, domains, and new uses of technology. They learned about Arduino boards, coding, programming, and a host of other technological innovations that allowed them to solve or explore problems in new and innovative ways. They were equally as interested in the science as they were the art.

In science class, curriculum focused on the Human Microbiome Project has included artistic as well as scientific explorations. The project is called *Expansive Meanings and Makings in ArtScience*, and is funded by the National Science Foundation. A collaborative group of Chèche Konnen Center learning scientists, from TERC, an educational research organization, in Cambridge, BAA faculty, BAA students and alumni, local independent artists, and the Broad Institute at M.I.T., scientists are exploring the potential of an ArtScience repertoire—transdisciplinary practices of cultivating attention, making, and critiquing together with a final, exhibition, performance, and communication—to support high school students in creatively responding to cutting edge phenomena. In this project, students investigate the emerging science of the Human Microbiome through both artistic and scientific models. For instance, to explore their skin microbiome, students are culturing bacteria from their palms, and then building sculptural narratives about the skin microbiome. They explore their emerging understanding of skin microbiome through movement, music, theatre/filmmaking, and painting.

Throughout the inquiry, by working with science and art faculty, artists, and research scientists, students are learning to integrate artistic and scientific materials, concerns, and processes to create ArtScience *stories* relating to aspects of the human microbiome they find intriguing, puzzling, significant, or even troubling.

For example, one student, a visual artist, who struggled academically, socially, and emotionally in class, truly excelled in her human microbiome project. She was completely captivated by the idea that she could create an artistic drawing of a scientific phenomenon that she deeply understood. In her project, she used stage makeup to create a representation of how her microbiome looked to her. “When you look at bacteria in the microscope many people are disgusted, but I saw beautiful designs and intersecting parts with potential for many colors.” When asked what she wanted people to take away from her art, she said, “I want people to understand the drastic difference between what people think and what it actually is.” She felt that she had previously learned science as discrete facts for a test with no real connection to her love of aesthetics or beauty. In this instance, for her, the study of science was both an academic exercise to understand scientific principles *and* an artistic challenge to present a visual representation that communicated both beauty and her depth of scientific knowledge. The ability to link and explore two disciplines was both gratifying and important to her as a learner. Her final presentation demonstrated just how much she learned both about herself, art, and science.

Dr. Nettrice Gaskins, BAA’s STEAM director, offers three recommendations (Gaskins 2016) when thinking about implementing a STEAM program in schools. The parallels between her suggestions and the workplace strike me as both obvious and important. One suggestion is “teach culturally relevant narratives to inspire students from underrepresented minority groups to learn and master tools in innovative ways.” Specifically, Gaskins explains that she helps students “produce inventions by merging aesthetic and technical production methods through redeployment, re-creation, and re-conception.” One example is how students learn that DJ Grandmaster Flash created a “cross-fader device to mix different audio sources.” Since people who do not look like BAA students dominate so much of the field of engineering and design, we must develop materials and examples that reflect their racial, ethnic, linguistic, and cultural backgrounds. Gaskins also emphasizes the importance of providing “choice, autonomy and time for collaboration.” These are

the very skills developed by the dancers in “SPEAK,” and they are the skills employers insist they most need and want. When students are given time to collaborate with peers, what emerges is more powerful and far-reaching than working alone. In a recent survey of BAA students about their STEAM lab activities, Gaskins reports that “70% report increased attention, defined as curiosity and interest and 68% report an increase sense of relevance [which they] defined as linking learner needs, interests and motives.” Finally, and perhaps most importantly, “67% felt increased levels of confidence defined as developing positive expectations for success.” Experimentation, risk taking, making mistakes, learning how to explore unfamiliar equipment, or problems are all key components to successful artistry and work.

HAS EDUCATION KEPT UP WITH FUTURE OF WORK TRENDS?

Teachers, principals, and education policy makers have always grappled with the tensions inherent in questions about the purpose of schooling and education (Dworkin 1959; Sizer 1984, 1992, 1996; Bowles and Gintis 2002; Tyack and Cuban 1995). Is education meant to develop a life of the mind and help young people enter college? Or is it to develop the skills needed for an ever-changing workforce and the economy? Depending on your perspective or role in society, you might have a very different answer. Many argue that by attaining a high level of education, people will live a life of dignity with a sense of purpose, commitment, and excitement about being a member of a community within a larger society. For others, the sole purpose of PK-12 education is either to attend college or attain a worthwhile career. Many would argue that our public school system is for all of these purposes.

In the United States, the current discourse in education reform circles is narrowly focused on the adoption of Common Core national standards. Although national standards have been popular in many other countries, the history of decentralized schooling in the U.S. elicits a fear that Common Core standards may result in more standardized testing. With increasing frequency, a score on a multiple-choice test determines decisions about a student’s future and many U.S. students are now tested for up to three weeks per school year. The anti-testing movement has criticized the federal role in mandating tests. However, a Common Core national approach to what students should know and be able to learn has garnered more support. Many argue for common agreement on the

skills that all students should attain, but not a common set of national standards that adhere to the new mantra of “college and career readiness.” Without a significant infusion of career and technical courses and schools, our new federal policies are not likely to bring more equity and access to our most vulnerable students.

In U.S. schools, in this era of high-stakes testing, few schools, whether charter or public, have shown innovative examples of new directions, particularly for urban students. BAA, however, continues to forge advances in teaching and learning with its commitment to high quality arts education and creativity. Perhaps, more remarkable than its high college graduation rate is the number of alumni with their own small performing arts companies. Hardly a month goes by in which I don’t notice an announcement in the local paper or on Facebook for a theatre or dance performance involving BAA graduates. The same is true with music and visual arts events: alumni work pops up all over the region. Of course, some of the alumni are now world famous. Kirven Boyd just retired as a principal dancer with Alvin Ailey. Diane Guerrero won the SAG award for best Latina actress and just published her memoir (Guerrero 2016). Most of the graduates are making work in their communities and are finding their ways as artists and scholars. As one graduate recently told me, in reference to her own emerging company, “You taught us to both value and tell our stories. And that’s what I’ve been doing every day.”

Another graduate, describing her years at BAA said:

I have lived in a community in which everyone breathed the same air. This air was called art. This school has demonstrated to me the importance of being not only artistically distinguished but also intellectually proficient.... I learned that knowledge is a powerful weapon that could be used to help and change humanity, but that it must be analyzed and owned first. This school developed artists and scholars that now have the power to stand as individuals and support their own perspectives and beliefs. We learned the vitality of appreciating and studying the evolution of man along with the evolution of art through time and history. (BAA Graduation Speech 2012)

Her BAA education helped her to,

...raise and answer questions such as ‘How do I use my art to educate society and to effect change in humanity?’ or ‘How can I use my craft to

eliminate issues such as ignorance hunger, poverty?’ I realized that those are questions that can take an entire life to answer. Art is the most effective and humane weapon to fight injustice and corruption. Art is the true expression of the human being. Art is the key that unlocks the world of the artist, and the artist’s response unlocks a world that mirrors society.

In an increasingly complex and uncertain world, BAA graduates have learned to walk in one another’s shoes, to sing in a new language, to explore movement that might be totally foreign from their own culture and perspective. They can appreciate the dissonance that comes from discovering differences without fear or disdain. Our alumni can express important life connections through drawing, painting, sculpting and building, and prevent those differences from becoming impediments to change.

CONCLUSION

Eliot Eisner, American philosopher and professor, made popular the “Ten Lessons the Arts Teach Us” (Eisner 2002). I invite educators and policy makers to study all ten lessons in efforts to create schools that our young people deserve. For now, I highlight three key lessons to embrace in providing our young people with opportunities for a successful future. The arts teach children the following:

1. To make good judgments about qualitative relationships. Unlike much of the curriculum where correct answers and rules prevail, in the arts, judgment—not rules—prevails.
2. The problems can have more than one solution and that questions can have more than one answer.
3. In complex forms of problem solving, purposes are seldom fixed, but change with circumstance and opportunity. Learning in the arts requires the ability and a willingness to surrender to the unanticipated possibilities of the work as it unfolds (Eisner 2002). (Adapted from the National Arts Education Association at www.naea-reston.org.)

Young people need to be able to collaborate and communicate well, and often across differences of language, culture, economic means, gender, and race. An education that stresses creativity and entrepreneurship can

positively impact a young person's ability to attain meaningful work. An increasing number of jobs require social skills like patience, persistence, and the ability to practice and pay attention in a changing environment. In many urban communities, especially those ravaged by high unemployment and violence, students are missing positive examples of work and beauty. An education in the arts can provide profound examples of beauty and give students the opportunity to write a new script for their lives—literally and figuratively. Our students often come from environments where poverty and lack of access to opportunities are the norm. Their arts education offers a way to enter the world more energetically, flexibly, and confidently. Whether a focus on the arts or any other form of learning, as we think about sustainability in education, may we invest more closely and carefully in the role creativity can and should play.

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A New Narrative for the Future: Learning, Social Cohesion and Redefining “Us”

Marjo Kyllönen

WHY DO WE NEED A NEW NARRATIVE FOR OUR SCHOOLS?

Do we need to rethink our education system, our schools and their functions? Do we need a new narrative for our schools? This chapter will begin by briefly exploring societal changes that are impacting schools, and then analyse the living environments of today’s children and what they might look like in the future. The focus of this chapter is the social and cultural dimensions of sustainability and the crucial role our schools play in enabling these processes. For our schools and broader education systems to be successful in contributing to sustainable well-being, a holistic picture of the challenge is needed—one that develops an understanding of a changing environment and society because these dynamic domains fundamentally challenge the current education system. It is clear that if our schools are oblivious to these changes and challenges, they will lose their power and value to society.

Massive change in every domain is challenging the current school system and its structures. Technology has historically been one of the core

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factors defining education systems because new technologies change the way we act, think, communicate and socialise, yielding an enormous impact on everyday life. The development of new technologies is exponential and its impact unpredictable (OECD 2016). And digitalisation is already rapidly changing our environments, procedures of communication and work. The flow of information is overwhelming; it is everywhere accessible to virtually everyone.

Artificial intelligence, robots and machine learning are improving and replacing the livelihoods of traditional middle class workers and are poised to replace even non-routine expert work. While this digital transformation is largely beneficial to mankind, there are some challenges to overcome. For instance, artificial intelligence can help solve complex problems. But as machines become more intelligent, they can easily replace human labour; ordinary skills are already being replaced by robots and automation (Brynjolfsson and McAfee 2014; Forecast 4.0 2015). The impacts will be widespread, but it seems clear already that young adults will not enter into linear career pathways; their working lives will resemble a mosaic of experiments and increasing career mobility. This will require a readiness to engage in dynamic and continuous lifelong learning processes and adaptability to a changing environment (Forecast 3.0 2012; Forecast 4.0 2015).

At the same time, the sharing economy and maker movement are also leading to a more open culture of distributed assets; resources owned by communities rather than individuals or institutions. As communities become ever more networked, new forms of arranging capital and services are evolving to meet the needs of local actors and are leading to greater local control of these services.

Even so, one of the challenges brought about by digitalisation is increasing inequality and in the future, inequality seems poised to worsen. How will working age populations adjust to a reality where routine work no longer exists? Is society ready for this rupture from the past, and how about schools? Will digitalisation lead to polarisation where there are those that have access to all and those that are marginalised? Whatever the answers, an imperative for schools must be equity, providing all children with the ability and skills to navigate the digital world. Critical thinking, the ability to evaluate, validate and sort information, detecting and managing online risks such as fake news among other skills are key to navigating this future.

There is of course a threat that highly motivated children reap the greatest advantages of digitalisation while less fortunate students will fall increasingly behind (Brynjolfsson and McAfee 2014; OECD 2016). But perhaps, digitalisation also provides some solutions to its risks: formal education is likely to evolve with technology to be more fluid, a network of structures and education services offered in a customised, localised manner that meets the needs of individual communities and learners. By optimising and customising learning paths for learners, collaboration will be cultivated leading to new learning innovations (Bauman 2000).

Digital solutions, the use of new algorithms and artificial intelligence, enables flexible and personalised approaches to learning while the web opens almost unlimited opportunities for learners to gain new competences and skills. The role of formal education and especially formal degrees is likely to diminish as the required competencies for working life continuously change, especially since artificial intelligence is already replacing human decision making. Mastery can be achieved in multiple ways, both through accredited and non-accredited sources. If the public education system fails to respond these demands, learners (families and students) will seek alternative solutions. This ability to choose to opt in or out of traditional learning structures could accelerate polarisation in society and inequality in education (Forecast 3.0 2012). For public schools to be successful in the future, especially in the Nordic countries, new arrangements such as public-private partnerships may need to be created to ensure that high quality education services will be available for each and everyone in the future regardless of their background.

Increasingly, we see multiple possibilities to connect in a more flexible way with other learners in multidimensional and flexible networks. This is both a positive development and at the same time a threat. As the virtual world opens new possibilities for interaction, simultaneously people can become isolated or be sub-grouped, atomised and excluded from the society (Bauman 2000; Forecast 4.0 2015). The question for educators is, are we ready for these changes? What is the role of education, if in the near future artificial intelligence could replace most of the transmission of knowledge currently done by teachers?

Globalisation is affecting all areas of life and impacting our ways of living. Our daily environments are more complex and multicultural

and local problems become global (the global financial crisis of 2008 is a prime example). People move freely across countries and our communities are ethnically, linguistically and culturally more diverse than ever. We face global challenges—such as climate change, migration, economic integration, rising inequality, all of which require global solutions. These political, environmental and economic wicked problems do not stop at national borders and can't be solved by individual people or nations, or tackled by using traditional approaches. Raising inequality requires a new approach to economic policymaking but also a new, deeper vision of social justice and cohesion. Increasing economic polarisation and unemployment combined with environmental volatility requires new approaches in education as well, and may be one of the plausible causes for redefining the purpose of education. Tackling these challenges requires collaborative approach, cross-disciplinary thinking creativity and brave actions (Forecast 4.0 2015; OECD 2016).

The change in demographics and global migration brings greater ethnic, linguistic and cultural diversity to our communities. Harmonisation of diverse values and global integration are fundamental challenges for populations whose identity is largely defined locally. However, these are critical challenges that must be addressed in order for individuals and communities to be successful in the future. These global demographic and migration trends amplifying diversification are not happening in isolation, but are connected to each other.

We are living in an era of accelerating change. The world has become more unpredictable and change is exponential. One consequence of this is that we really cannot predict the future—but we can imagine it and ask leading questions such as “what if”? We can look for signals and try to understand the drivers of change and societal transformation that will affect everything, especially teaching and learning (Dalin and Rust 1996; Forecast 4.0 2015). The current education model in the West was designed for the needs of an industrial era, a time of mass production and specific professions. Obedience and basic dexterity alone were a reasonable competence for the time of Spinning Jenny-style technology. This world does not exist anymore. But if we look at the average classroom, the design of the school has remained almost unchanged! The crucial question is, are we truly aware of the demands and expectations this change will force on us?

WHAT IS A SCHOOL OF THE FUTURE?

Paraphrasing Buckminster Fuller: we can't predict the future, but we can make it. People, organisations, nations play a crucial role in defining what the world will be tomorrow. And this will not happen in vacuum. Our actions towards the future are always value loaded, based on the ideas we think are worth developing. They reflect the fundamental values and norms of our society. And the educational system must reflect the society we would like to inhabit in twenty or thirty years from now (Dalín and Rust 1996). That is why we cannot ignore what is happening in our schools today *and* how education systems are to be developed in the near future. This may sound like an exaggeration, but it is true: the future of our society lies in the hands of our schools and educators. The actions we take today are the stairways to tomorrow. So, it is a matter of choice: what do we want the future to be?

Changes in our environment are challenging our education systems in various ways. Education systems have always had various tasks in society such as to create responsible citizens, to provide individuals with skills and competencies needed in the future and to provide good and qualified workers for the labour market. But are these still the central aims of education in a changing world and if so, what will be the most important for the success of our societies? Education systems can be effective tools for driving desirable change in society and transforming society for the future. But to do so successfully, education systems must be valued and respected by society. That's why an essential question today is, do our schools and more broadly our education systems provide our young ones with the competencies needed for the future? And do children need to come to school to learn at all? Is it meaningful that they are there? If they are at school, how does that environment contribute to a sense of well-being when so much is uncertain?

Education has traditionally played an important role in preparing individuals to enter society and the market economy by providing them with the competences needed to participate in both arenas. However, this function comes into question in a world where knowledge is everywhere. Where does it leave our formal education? Can it equip our children with the competencies needed in the future society and also in working life? On top of these fundamental questions is the daily concern that learning must be meaningful for students. How can these competing interests be met?

The traditional way of teaching where knowledge is fragmented is absurdly not relevant any more. The children that now are beginning their school careers will still be at the labour market in 2070. It is hard, if not impossible to predict what competencies will be needed for that era. To learn and be competent within one profession is no longer sufficient, even today. Therefore, the task of the education system must be to enable students to meet the future with flexibility and curiosity, motivation and competence to learn and they must be resilient in the face of change. Learning must make sense to students—they must understand why and for what purpose they are learning and how they will utilise these competencies and skills in everyday life. In order to do this, they must move from repeating or searching for information to an ability to evaluate and order information (Dalín and Rust 1996; Forecast 4.0 2015; Salmela-Aro et al. 2016).

We are at a turning point: it is time to rethink the role of our schools for a sustainable future. Practically, the world we must prepare our children for does not exist, yet still we have to provide students with the competencies they will need for a society that promotes well-being and sustainability. This is the dilemma facing educators, policy makers and parents. We will be forced to make decisions about virtually every aspect of education, subject-based curriculum, for instance. We know from experience that life is not split into subjects, yet we teach as if it is, which likely makes some problems worse. What a learner needs is a good quality *learning process*, where knowledge is built on the basis of different subjects and their knowledge structure, but taught in a holistic way.

What schools must do in this complex and multidimensional world is to provide children with a flexible mind, understanding and respecting every member of the society regardless of their backgrounds or capabilities (Adler 2002). Education is for the civilisation of nations—an independent value and task in society; it is what powers the next generation to become full members of society. Can we leave this task to the internet? Or do schools still have something to give to children? My answer is yes, and moreover, the role of the school in the future will be increasingly important in promoting sustainable lifestyles and attitudes that are essential to the well-being of our societies.

SOCIAL CHALLENGES, WELL-BEING AND EDUCATION

Education plays a crucial role in promoting well-being and sustainable development in Finnish society. And also, the well-being and participation of our pupils are the key factors for them to be successful in learning

and reaching their potential. The well-being of society and the individual are intertwined in schools. The current Finnish concept of comprehensive education for all has been built on a strong vision of equality and equity that offered equal opportunities to every child irrespective of their background. Those behind this historical reform understood that for Finland to be successful in the future, the country cannot lose any potential that exists in its youth. And this founding principle remains strong today.

However, globalisation tends to accelerate polarisation: widening gap between rich and poor countries as well rich and poor individuals within a country. Finland has been among the most equal OECD countries in PISA research. Finland is an egalitarian welfare society and our education system is very egalitarian as well. Most of the children go to the neighbourhood school and the spatial segregation is considerably low compared to the USA (or other European countries). The learning gap in between the best and worst performing pupils is the smallest among OECD countries. The same is true for learning results between boys and girls (Bernelius 2013; OECD 2012).

In the fight against poverty, offering equal opportunities for every child to access good quality education is crucial. For the less privileged, the role of the school is central to promoting social, emotional and physical well-being as well as building civic and cultural literacy and skills. As is known, socio-economic background is one of the strongest factors shaping one's future across their lifespan. A good quality education can reduce the effect of social background and bring about equality and equity. To be a full and active member of the future society requires good self-esteem and self-confidence. This can be achieved only if children have an authentic experience of belonging and closeness (Dalin and Rust 1996; OECD 2016).

At the urban level, spatial segregation in Helsinki has been quite moderate compared to other European capitals (Vilkama et al. 2014). But there is a weak, but clear, signal of polarisation in the city: during the past years, Helsinki has experienced a similar urban polarisation development to other large Finnish cities similar to European and American contexts. Recent research indicates that this polarisation process is going on inside our cities as well. The most remarkable change has been how the population of immigrant pupils has been distributed in different parts of the city. In some schools, the population of non-native Finnish Speakers is around 50% and in some schools it is nearer to zero. And at the same time, deprivation seems to cluster. When we compare these

statistics to the socio-economic background of families living in these neighbourhoods, they correspond with immigrant families and a lower social economical background.¹ This differentiation of public schools in Helsinki and at the same time, the spatial socio-economic and ethnic segregation within the city is a fairly recent phenomenon as the city has had remarkably low-spatial segregation. Recent research points to a neighbourhood effect: pupils tend to have a higher level of attainment and express somewhat more positive educational attitudes in schools with a higher parental educational level and overall attainment level, regardless of the pupils' own family background (Bernelius 2013, Statistic City of Helsinki). It is a kind of vicious circle where the polarisation of the neighbourhood fosters the polarisation of the schools and vice versa. The performance gap between Helsinki's schools has grown, though the differentiation inside one school is still greater than in between schools.

There have been several actions at the Helsinki city level to tackle polarisation and segregation inside the city. For more than ten years, the city has had an active policy distributing more resources to those schools that are in neighbourhoods with greater need. Approximately 3 million euros per year has been delivered to 44 schools. The schools may decide how to use this resource: to hire more teachers, school assistants or to buy teaching and learning material, to organise school trips etc. The criteria for Positive Discrimination (PD) schools have been:

- An average level of education in the district
- The economic level of the families in the district
- Number of non-Finnish speakers in the school
- How “attractive” the school is: percentage of local residents who attend the school

There is a strong consensus and experience that supporting those districts that are facing more challenges than the others is an efficient tool to prevent dropouts. But the money is only part of the solution. The competence and attitudes of teaching staff and our leaders to work successfully with pupils of different backgrounds is fundamentally important.

The challenge of rising inequality requires a new emphasis on social cohesion and a new commitment not only locally but also globally. Education is the most powerful weapon to fight against inequality and to promote social awareness and responsibility, to promote well-being of all people, especially those coming from less privilege surroundings.

In a diverse world, education can create a new sense of cohesion—a new concept of us, helping to define identity, instilling values and in this way also helping the integration of newcomers and migrants. Education can directly affect global trends by providing children with the competences and skills needed to build a more sustainable, just and successful future society (OECD 2016).

CULTURAL AND ETHNIC DIVERSITY IN OUR ENVIRONMENT

Increasing immigration to Finland has made the country more ethnically and culturally diverse than ever before. Similarly, the number of international migrants has grown rapidly across OECD countries. This is challenging society to rethink the policies in the interest of multiculturalism. It is not a question of integration but moreover how do we create social cohesion and a new national identity that is socially cohesive. This does not require societies to merge; on the contrary cohesion can be achieved in a pluralist environment through constructive interaction and dialog. This is not an easy task as greater cultural, ethnic and religious plurality rises tension between different stakeholders (OECD 2016; Putnam 2015; Zetter et al. 2006).

Increasing diversity raises new challenges such as how to form new social cohesion at a time of increasing diversity and how to ensure that immigrant pupils achieve at the same level as their non-immigrant classmates. The challenge for the education community is to build a comprehensive, mutual understanding of *us*; to form together the values of society, empower every newcomer, strengthen their identity and sense of belonging within society and stop radicalisation and tensions among groups (OECD 2016).

Schools must provide students with the skills of global citizenship and competencies such as cultural sensitiveness and awareness, co-operation and collaboration, understanding and acceptance of diverse cultural values. To be successful in cross-cultural adaption, we must understand that every culture is distinctive—their values, norms and beliefs that give meaning to individuals and societies. No culture is inherently better than the other; all cultures are equally valid and valued. And every one of us is culturally bound together to some extent (Adler 2002). The crucial question for the well-being of all members of society is how the school systems respond to increasing migration.

In Finland, the environment has become more complex, multidimensional and multicultural than it was when the current Finnish model for basic education was invented. Finnish society, as well as Western Europe, has been quite homogenous leading to a shared understanding of *us*, at least at a national level (Dalin and Rust 1996). Today, the cultural and ethnic background of pupils and families is more diverse than it was in the past.

Helsinki has been the capital of Finland since 1812. It has grown from a small town of 4000 people to a medium-large city of 600,000 inhabitants. Together with the surrounding cities, Espoo, Kauniainen and Vantaa, greater Helsinki forms a metropolitan area of 1.4 million inhabitants. Helsinki has grown rapidly during the past decade and 63% of net migration gain has been non-native Finnish speakers (Tikkanen 2014; Vuori and Laakso 2015). However, in the beginning of 2015, only slightly more than 13% of the total city population had a foreign background² (Hiekkavuo et al. 2016). In the basic education system, 20% of all pupils in Helsinki's schools are non-native Finnish speakers.³ The amount of immigrant-background pupils has grown rapidly during the past years and it is predicted have a rapid growth also in the future (Statistics 2016). The statistics also show that young immigrants living conditions in many areas are poorer than their classmates⁴ (e.g. low income and unemployment) (Ranto et al. 2015). For our education system, the most challenging group are young people migrating to Finland at the age of 15–18 during or just after the last years of compulsory education.⁵

The latest PISA-research result revealed that first- and second-generation immigrant students in Finland perform alarmingly worse than their non-immigrant classmates in problem solving, mathematics and literature, and by the end of their compulsory education, the immigrants were two years behind their non-immigrant classmates (OECD 2015; Harju-Luukkainen et al. 2014). What makes this result even more troubling is other recent research which shows that on average the Finnish language skills of the immigrant-background students was at a good level, especially among second-generation pupils (Kuukka and Metsämuuronen 2016). So the lower learning results can not merely be explained by not to having sufficient Finnish language skills. One of the factors that explained the learning differences was the socio-economic background of the pupils. When we combine this result with the fact that in many cases the immigrant-background childrens' living conditions are worse by many

measures than by their classmates, we confront the real challenge of segregation.

With these indicators raising alarm, the question is how can we tackle this challenge? Is there something we could do today to address segregation *and* build a better, sustainable future? The dropout rate among immigrant-background young people is considerably high compared to their non-immigrant classmates. This can lead to a situation where exclusion from society is due to a pupil's background. This injustice can no longer be ignored. We must rethink our actions and education practices and understand that for a sustainable future, we must get to work building new sources of social cohesion and a new, shared understanding of *us*. In Finland, and much of the rest of the world, our challenge is how we can create a new understanding and cohesion out of the diversity and multiple identities we have in our societies.

As the amount of immigrant pupils has increased in Helsinki region, one of the city's challenges is how to promote inclusion of young people who immigrate to Finland and have virtually no formal educational background. The city's response has been to develop means of supporting immigrant students to become full and active members of the community. In Helsinki, like in the most of the biggest cities, traditionally the newly arrived migrant students (NAMS) must start their formal education in preparatory classes. They follow a specific curriculum for one year (under 10 years old=900 hours and over 10 years old=1000 hours). Preparatory classes are in different schools, but not always in the student's neighbourhood and thus pupils may need to travel to another school. But every pupil will have a personal learning plan based on their skills and needs that is written together with the teacher, parents and pupil. Though the objectives are set in the beginning of the preparatory year, they are flexible and can be modified as the pupil develops. Pupils in the preparatory classes integrate into the mainstream classes as soon as possible, usually first in the non-academic lessons like sports, art and music. However, this separation of learning environments may not be most beneficial to student performance.

The new Finnish National Curriculum for basic education emphasises the importance of inclusion and the right for every child to study with their classmates at a neighbourhood school (OPH 2014). These principles will be widely implemented, including for Helsinki's NAMS. Practically, this will mean that all the first and second grade NAMS will be integrated into mainstream classes. As of 2017, there are pilot projects

in a few Helsinki schools and the early results are very promising. In this new approach, schools receive extra resources for each NAMS and are permitted to decide how to use it in the most efficient way to support students integrated into the mainstream group (e.g. hire more teachers, class assistant, etc.). When teachers work together in pairs or groups they have more flexible arrangements in the classroom and can support individual pupils better. Also in this model, every NAMS has a personal learning plan with personal objectives based on the skills they have. After one year of inclusive preparatory instruction, these pupils continue their studies with their classmates and then follow the basic education curriculum.

In Finland, school days are the shortest among OECD countries and there not many extracurricular activities that take place at school after the school day. For first graders and some second graders, municipalities provide afternoon activities to a maximum of five hours a day. But for older children, similar activities are not provided by the municipalities, leaving it to a parent's ability to enable after school activities for their children.

To be included in society, it is of the utmost importance to find your place. Find one's place includes seemingly minor things like access to activities after school hours. This has proved to be a crucial challenge among our immigrant pupils especially among those that have arrived to Finland at the age of 15 or above. Helsinki provides a rich recreational environment for youth, but a recent city survey showed that children and young people with lower socio-economic background utilise these possibilities far less than those from a higher socio-economic background.

To help our newly arrived immigrant pupils to find reasonable activities after school and thus prevent exclusion from the society, municipal education managers have started an intensive co-operation between schools that have older NAMS preparatory classes and the local youth centres. In this model, a youth worker comes to the school to work with teachers to develop different possibilities for the students to visit locations in the city and introduce them to new low cost hobbies. The aim is to support holistic integration and social inclusion of the student as well their family. The expertise of two different professions from two separate departments provides more holistic support for students and their families.

As often said, it takes a village to raise a child. But what are the villages of our time? And can a growing understanding of social well-being and belonging create a new type of cohesion in our society? Can schools foster a greater sense of community not only inside the school but also

in families? Education is an effective instrument for lifting people out of poverty, but what are the incentives that are effective enough? If our schools do not understand their role in promoting well-being and social cohesion, they will fail in their most important role. After all, education creates societies.

THE POWER OF EDUCATION—PARTICIPATION AND BELONGING

Today, half of the world population lives in cities and it is predicted that by 2015, seven out of ten people will be living in cities. Cities are the hubs for human capital, research, innovation and resources. They provide multiple employment opportunities and ways to move up the socio-economic ladder. But at the same time, cities tend to host high levels of poverty and exclusion from labour market and society in general. These difficulties can create isolation, tenuous networks and social alienation, lack of trust and violence (OECD 2016). Citizen's participation and involvement is a powerful tool to prevent exclusion. For cities, it must be a priority to build up and empower communities—to increase quality life and well-being for all the citizens.

People who have a real experience of participation, understand how they can influence society, they are active citizens. This experience tends to strengthen tolerance towards other people in a diverse environment. The societies that promote well-being and participation of its citizens work against marginalisation and exclusion and strengthen social cohesion (Putnam 2000; Pettit 2012). An individual is unlikely to have the experience of belonging if they are not at some level empowered. This is especially true for schools and their students. If we want to be successful in the future, we need to stretch ourselves into our surrounding community.

The diversity and flexibility of society are the key elements for successful and sustainable future. Diversity and flexibility creates resiliency that is needed to cope in a complex and unpredictable environment. But this is only true if there is a free flow of information and real collaborative networks. If the community is fragmented and subgroups are excluded, diversity becomes a hindrance instead of a source for further growth and success of the community. This can lead in its worst case to destructive conflicts (Capra 2009). The question then is how to lead diversity in a way that it promotes well-being and success of the community. How can policy makers, community leaders, schools and families involve and

empower neighbourhoods so that everyone has an authentic experience of belonging and participation? First and foremost, in the context of education, this requires a deep understanding of school culture and the ability to develop it in a way that fosters everyone's participation and empowerment, especially those most marginalised.

Participation in society also requires strong involvement of public institutions and the opportunity and space, to become socially active. The role of the government and municipalities must be to create forums to encourage open discussion between the community and service providers (Mayan et al. 2013). In the city of Helsinki, participation of the citizens is one of the city's core values and strategies. Citizen involvement is a significant policy tool to promote well-being of all. Helsinki is also strongly emphasising the importance of participation of children and adolescents in a programme called *Ruuti* that engages all city departments and decision makers with youth. The programme is based on the belief that everyone should have and use their voice to influence everyday practices in their schools and government.

Youth participation is a key asset to promote active citizenship and social inclusion and thus prevent exclusion from the society. Helsinki's goal is that all youth will have a positive experience of democratic participation every year and thereby experience what it's like to make a difference by working towards a greater cause. As a matter of policy, young people are to be heard on issues affecting them, and their initiatives are taken seriously by the city. Their actions and initiatives will improve Helsinki and citizens' quality of life. The genuine experience of participation fosters a sense of belonging and intrinsic motivation because it enables young citizens to understand their agency and their power to make a difference.

SOCIAL COHESION AND A NEW DEFINITION OF *Us*

As stated above, the challenges of rising inequality require a new emphasis on social cohesion and a new commitment to address it, not only locally but also globally. Education is the most powerful weapon in the fight against inequality because it can promote social awareness and responsibility (OECD 2016). The Finnish education system has succeeded in solving multiple challenges that many other countries have not. Finland has been a model country for education and the design of our education system is unique. But we must rethink the role of our

education system if we want to build a sustainable future. Our next most pressing challenge is the ethnic, cultural and language diversity present in our schools.

Collective identity is an imperative when examining the social change. It allows different actors to have a sense of belonging and links to other individuals and groups and thus creates a joint, collective experience (Mayan et al. 2013; OECD 2016). Schools form a natural seedbed for fostering social cohesion and a new definition of *us*. Pupils come to the school to learn and do things together—an opportunity that should be taken advantage of. Collaboration, social skills, social responsibility—the ability to work and build knowledge together with different learners—these are the competencies and qualities that must be promoted at school.

How then to create social cohesion and a new definition of us? I believe this question is more current and crucial than ever, especially in the school system I manage. A new definition of us is built on a strong sense and understanding of who each of us are as individuals—our backgrounds, culture, language, and history. One cannot be a strong member of society before you know who you are and where you belong. For schools, this requires a deep understanding of school culture and the ability to develop it in a way that fosters everyone's participation and empowerment. I will come back to the importance of school culture and leadership later, but let's first look at social cohesion and the importance of identity.

Social cohesion is based on the willingness and capacity of people to co-operate with each other in a diverse environment. A socially cohesive society does not mean a society where all share the same values, beliefs and lifestyles—on the contrary, a socially cohesive society benefits from diversity (Stanley 2003). Society is shaping individuals at the same time that individuals are shaping society. This is a constant battle or a systemic circle of development and thus a process where—if we succeed—we can create a new concept of us, a new meaning who we are (Bauman 2000; Putnam 2015). Social cohesion does not mean identical values, but it is supported or nurtured by values such as equality, tolerance, freedom and respect for human rights. Co-operation and collaboration can nurture freedom, equality and respect for human rights (Larsen 2014; Stanley 2003).

Social cohesion and social outcomes are affecting each other. It is a systemic circle where one does not exist without the other.

Social cohesion is about driving towards a more inclusive society where people have a sense of belonging and experience of authentic participation. The process is dependent on the willingness of the people; if they have an experience where they are not valued and treated equally, it will degrade their willingness to co-operate with others and thus diminished cohesion (Stanley 2003; UN DESA 2012). Zygmunt Bauman (2000) defines civility as “the ability to interact with strangers without holding their strangeness against them or without pressing them to surrender it or renounce some or all the traits that have made the strangers at the first place.” This is the kind of civility school leaders, teachers and policy makers should promote in the everyday life of our schools. Assimilation is not the way to build up a successful future for our society. In a way, we all are strangers to each other, so there is no division but only shared experience. This requires a mutual understanding and respect. It is an ability that does not come for free. We must practise it—how to be in a fruitful interaction with strangers.

Modern society is a society of individuals. People want to go their own ways and not be disturbed. The rise of a hedonistic “me first” attitude is a phenomenon of the contemporary era. It seems increasingly clear that the growth of individualism is a threat to the public good and sense of community. Public space is now filled with private demands. There is a constant tension between the public good and an individual’s wants (Bauman 2000; Kyllönen 2011). Individualism does not build societies. It points in the other direction, towards where everyone is responsible for their own future. This at the same moment, we need people who are willing to relearn the skills of true citizens. Schools can and should be the places where we teach our children trust and engagement in their own surroundings and societies, starting with their own classmates.

THE NEW IDENTITY OF “US”

All identities are constructed from various sources of history, culture, religion, geography and collective memory. Construction of one’s identity is simultaneously an individual and social process and it is culturally rooted. Disjunctions or problems in the process of building up identity are linked in part to the difficulties of environmental change or disruption. We are living in an era, where our environment is more complex and unpredictable than ever before and the development of a durable

individual identity is in danger. Not only have the teenagers felt insecure and fragmented but also the adults do (Castells 1997; Nuutinen 2015). The way we talk, the language we use is a powerful weapon for building societies or building walls—how we talk about and to others is crucial. Do we think that *we* are *we* or is there *us* and *them* (Castells 1997; Kegan and Lahey 2001)? Right now it is unclear, and that is why we need to build a new public narrative of *us*.

The diversity of our environment challenges us to rethink and redesign our concept of *us*. If we fail in this task, the consequences will be dramatic. Exclusion from the society—the sense of not belonging—can be the seedbed for radicalism and extremism. Finland has been quite a culturally and ethnically homogenous nation compared to other European states which may be a factor in the country's success (Castells and Himanen 2002).

Multiculturalism can bring about positive value for an equal society and for the construction of social harmony. But there can be a darker side too: multiculturalism policies can amplify “otherness.” There is a tension between the ethnic identity and universal identity of citizens who share the values and norms of society (Prato 2009). A new identity of *us* can be constructed when we shift from additive programs tacked to the regular programme of studies focused on specific ethnic group to a holistic approach where the legitimacy of multiculturalism is no longer in question. The best strategy to accomplish this is to capture the best aspects of diversity (Dalín and Rust 1996). It is the formation of a new personality: a multicultural identity where people recognise simultaneously the similarities between all people and respect the diversity of humankind. They do not want to eliminate or assimilate the differences. Multiculturalism is a necessary outgrowth of the diversity and complexity of the twenty-first Century. In this respect, instrumentalising differences provides a pathway to a better future (Adler 2002; Hargreaves and Fink 2006). A multicultural personality has a flexible mind and evolves rapidly in a changing world. She or he has a capability to be adaptive and productive, even in ambiguous situations.

The new “*us*” is built on the diversity inherent in our environments. Our ethnic and cultural backgrounds are sources of both meaning and identity. To build a new concept of “*us*,” a new sense of social belonging and identity should not be the product of assimilation (the melting pot), but constructed from a new narrative of us that grows from the diversity of each community. In constructing a collective identity, it is important

to celebrate what makes every person distinct. This gives the community a stronger sense of unity and balance because it allows differentiation inside the community. Collective identity also needs a vision at the state level—a national narrative—paired with an understanding of national well-being, otherwise the world of individual identities, where people are seeking their own well-being and prosperity will persist (Baumann 2000; Castells 1997; Castells and Himanen 2013).

The social construction of collective identity is always rooted in a context of relations and schools are communities where children can build a collective identity. Today, pupils should come to school to collaborate; an activity for which school leaders, teachers and policy makers must make time and space. Through collaboration, students will build strong relationships that can lead to a new concept of *us*. It is not a question of integration or assimilation, but moreover an interactive process of redefining identity together that is needed (Castells 1997; Nuutinen 2015; Prato 2009). Schools can be the starting point for a transformational project for constructing a new identity that can then scale towards the transformation of society.

A public narrative can construct both individual and collective identities. A shared narrative can also provide the motivation and courage to take decisions that lead towards a better, sustainable future. Marshall Ganz (2011) divides narratives into a *story of self*, a *story of us* and a *story of now*. The *story of self* is a story of our individual values and hopes. It is a construction of our own identity—who we are and what is unique about us. Social movements arise from new *stories of us*; they are stories about organisation and interaction. The story of us is a community story of our shared values and goals. It is about telling a story that invites people to join together to be members of a community. The *story of now* asks people not only to join together, but also to take collective action. Collective stories are the most important and interesting because they tell us who we are relative to a larger community which can provide certainty in an unpredictable world in a way stories of self cannot. Organisations that lack the story of us also lack a shared identity. The story of us expresses the values of the organisation or community. It is a collective identity that enables us to communicate and collaborate with those inside the community. The *us* can take many forms: family, community, neighbourhood, organisation and nation (Ganz 2011; Kegan and Lahey 2001).

The story of now captures the challenge we are facing today in trying to build a sustainable future in the face of climate change. Hope seems to be

increasingly fleeting as the climate crisis grows and global action remains marginal. A story of hope is needed, of how we can tackle the many crises confronting humanity. But in telling a story of hope, we must face the facts. As Ganz wrote in 2011, “hope is not to be found in lying about the facts, but in the meaning we give to the facts” (287). With hope, we need a strategy according to Ganz; a way to get from here to there. A way, that as a collective, we can overcome. This global collective will be born from a new identity of *us* that is as richly diverse as humanity itself.

A NEW NARRATIVE FOR THE FUTURE SCHOOL

As discussed above, the world has changed, but the narrative about the purpose of schools has not. And it is not sufficient to only make marginal corrections—a new story about our schools must be told as if the school was to be invented today. This must be a holistic story told not only by educators but also by all actors in society. It must be systemic in nature, not just aimed at narrow objectives such as academic achievement or labour force readiness.

The development of our school and education system for the future must proceed in a systemic and interactive process where society as a whole creates a framework for development of a school’s operations and leadership. This process must determine the prerequisites for the development of schools, set the boundaries and ambitions, and critically, provide the resources necessary to achieve the vision. At the same time, schools today can work to bring about the change by influencing (updating) the perspectives on schools held by society (see Fig. 10.1).

External and internal factors define the possibilities and barriers for the development of a school. The outer boundaries of operations in a school are determined by societal development, the status and role of the school in the society and the nature of decisions made at both national and local levels. Inside the school, the opportunities for growth are tied to how the school develops as an organisation and opens up to the surrounding community. In general, a distributed approach to leadership is a critical success factor in the future school (Kyllönen 2011).

Schools are unusual, perhaps unique organisations—I struggle to name an analogue. Every organisation has its unspoken or unrecognised basic assumption such as “this is how we’ve always done business, this has been a successful way for us to solve problems” (Schein 1985). These basic assumptions sustain the organisation; after all, there is no need to “reinvent

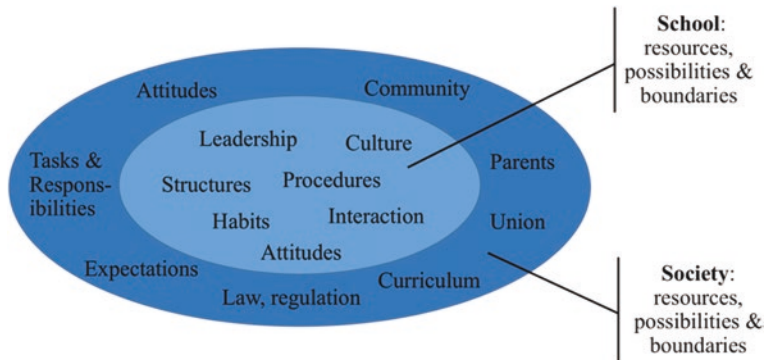


Fig. 10.1 The possibilities and boundaries for school development

the wheel”. However, they can be dangerous expediciencies—doing business as usual though the pattern of behaviour is no longer relevant. Schools are an organisation where all the members (teachers, principal, supporting staff) and even the customers (parents, students, society in general) have been raised by the organisation itself. We all have memories from our own histories in school about what makes a good or poor quality school. The problem today is that the world has changed and what was relevant in past does not meet the current and future needs of society.

To rewrite the narrative of the future school, a deep understanding of systemic change must be combined with the ability to make change at scale, not just marginal improvement (i.e. reform). To make a sustainable change to schools, it is critical to have a robust understanding of the school as a highly specific breed of organisation with unique structures, leadership, organisational culture and pedagogical implementation mechanisms as well as stakeholders vested in the organisation in uniquely personal ways (Fig. 10.2).

Archimedes said “Give me a lever long enough, and I can change the world”. To change schools, effective leadership is the key factor; it is the lever that can make systemic change happen. We need leaders who understand the role of public education in creating a new definition of *us* which can be achieved in part through a process of creating a new narrative for the future school. However, leaders are not isolated on an island and do not make transformational change happen alone. Of equal importance is the organisational culture and its resistance to or readiness

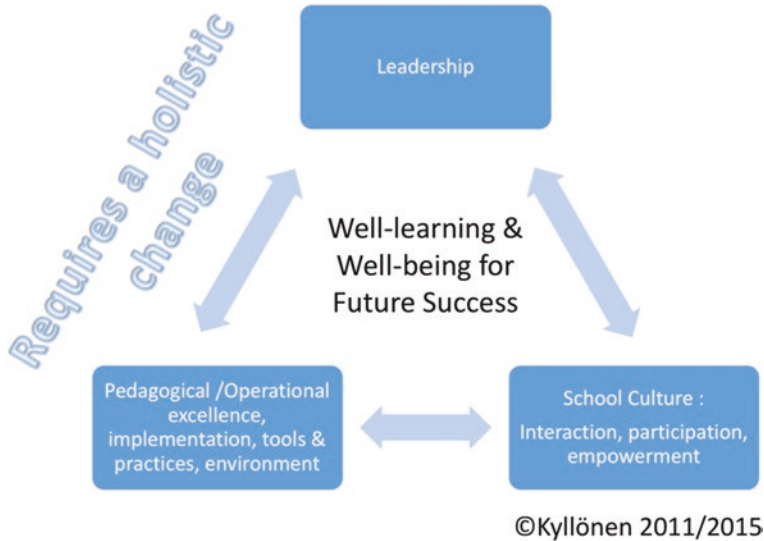


Fig. 10.2 Key factors for the successful and sustainable change in the future

for renewal and change. It is a dynamic process where leaders create the conditions for changing operational culture and simultaneously the culture of school fosters further change (Fullan 2005).

A well-functioned school is a *learning organisation*. It is a living organisation that understands the urgent need to develop and change; to learn in order to be an organisation that stimulates the learning of its stakeholders. A successful school understands its role in the changing society today and has a vision for and of tomorrow (Dalin and Rust 1996; Hargreaves and Fink 2006). For too long, teachers were understood to be transmitters of knowledge. Today, they must form a collaborative community of professionals. This will be challenging for a profession that has a long history of autonomy. But collaboration is the key to taking a holistic approach to the work of the future school (Adler et al. 2008; Fullan 2005). Because this kind of collaboration will challenge existing structures, leadership must also come from teachers.

Leadership that is *head, heart* and *hands* is necessary to make change happen as Ganz (2011) suggested. The head is strategy: how to allocate resources to achieve desirable results or objectives. Heart overcomes the challenge of motivation: how to inspire people to act towards the

greater good and have courage to take risks in order to make this change to happen. Hands is the ability to learn by doing—an opportunity especially relevant to teachers. Talented leaders can lead their organisation with narratives that give individuals a new definition of us—of belonging. Public narratives empower, help to construct identity as individuals, community and nations (Ganz 2011).

Wise leaders use their narratives in a way that it empowers their people, give vision and hope. They see the possibilities, the pitfalls and are able to lift their people to another level. Martin Luther King Jr. was just such a transformative leader who used powerful narratives that redefined *us*. He knew how to speak to people, how to lift them to act towards change. In a time when the American dream of equality regardless of racial, social or religious background was not available to everyone, he rose and shared his dream. He could have said “our reality is a nightmare” as it was being experienced by the marginalised, but he wanted people to believe in a better future and used his narrative wisely to suggest a way forward. This is the kind of leadership needed today, both national prominence of King, and also within the classroom (Ganz 2011; Kegan and Lahey 2001; King 1963) The way we talk, the narrative we tell affects the way we act and work. Narrative is not irrelevant, especially as we work to build a new society for the future.

We need a new public narrative to create social cohesion; a precondition essential for success of our society in the future. Public narrative is a tool to transform our values and our will into action to make choices for a better future. This starts with telling a new *story of us* that builds a new community of us. This happened in the 1960s when the people of Finland had the vision to offer equal opportunities for all and built an education system to deliver on that goal. There was a vision for the future—about the times we are living in now—and Finns had the collective courage to act accordingly despite resistance and prejudice. Are we now resting on the laurels of our past success? Yes. The world has changed and there is now an urgent call for a new story of *us*.

CONCLUSION

I strongly believe that our education systems are at a turning point and that it is past time to rethink the role and status of schools and our education system more broadly for today and the future. The current education system and its widely shared practices were designed for the

needs of the industrial era; a time of mass production, routine work and narrowly defined professions. One only needs to look around to see that this world does not exist anymore. If education systems do not recognise this need for fundamental redesign, it may lose its value, power and role in society. To be successful in the future—to promote sustainability, well-being and well-learning—we must write a new narrative for our schools.

The world of today and tomorrow is more complex and more diverse than ever before. We must learn to respect diversity and similarity in new ways. The increasing diversity of our everyday lives challenges us to rethink and redesign our concept of *us*. If we fail in this task, the consequences can be dramatic. Exclusion from society—the sense of not belonging—can be the seedbed for radicalism and extremism. To build a sustainable society, we must learn to think beyond ourselves, our own interests and understand what is right under these radically new circumstances.

For any nation to be successful in the future, the best way is to invest in good quality education system (this is the lesson Finland has learned over the last 60 years). Education that promotes social cohesion, equity and well-being for all citizens must be an organising principle. The success of the education system is strongly connected to the success of society as a whole in the case of Finland and many other countries

As Dalin and Rust wrote in 1996, “Yesterday’s problems shape the present school” (30). By this logic, today’s school cannot prepare students for the future. We urgently need a systemic change! Isolated actions will not be enough. We cannot make the change needed by correcting small problems. We need a holistic, systemic approach where schools and their functions are reflected in a larger context. School must become a societal organisation. It must be open to the surrounding society—and not only open but also in a productive, co-operative co-dependency.

For social, cultural, ecological and economic sustainable development, it is of utmost importance to learn and do things together. Social and societal learning can happen only when different learners and actors come together to share ideas and experiences with others in an open, productive way. The resiliency needed in the face of a complex, volatile environment can be achieved only in a society where diversity is understood to be a seedbed for the future success (Dyball et al. 2009). To be successful in the future, we must redefine the concept of us and

thereby build a new identity of us that consists of all the diverse cultural, language and ethnic identities we see in our classrooms today. It is a process where we learn together in a fruitful interaction and discussion in an atmosphere of trust that recognises the value of all people.

What is the future for our schools and our societies? It is impossible to predict—but we can build it! There are problems and challenges that must be conquered—but at the same time, there are more opportunities and underutilised resources (witness the sharing economy) in our communities than ever before. The question now is, do we have the courage to take the right decisions and actions today to build a better future for our children? The actions for the future are never objective. Our values define our visions for the future, including and perhaps especially the future school. I believe that the role of the future school should be to create social cohesion in societies and promote well-being and participatory communities. This school will work to empower not only those who are working or learning at school but also the society as a whole.

Winnie the Pooh once said a very clever thing to Christopher Robin: “You’re just in time for the best part of the day!” “And what time is that?” asked Christopher Robin. Winnie answered, “When you and me become *we*” (Geurs 2006).

NOTES

1. Correlation lack of education and non-native Finnish speaking is remarkably high 0.83.
2. People, who speak other mother tongues than Finnish or Swedish or Sami, the official languages of Finland.
3. In 2015, 17% of all the young people age 15–23 have an immigrant background in Helsinki.
4. 45% of immigrant background minors.
5. All children living in Finland are subject to compulsory education that usually starts the year they’ll be 7 years old and finish after 9 years of education, or the latest year they become 17 years old, Basic Act.

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Climate Change Education: A New Approach for a World of Wicked Problems

Anna Lehtonen, Arto O. Salonen and Hannele Cantell

PURSUIT OF A GOOD LIFE ON A FINITE PLANET

A rapid growth of population and more materialistic ways of life have given rise to what many geologists now call the era of the Anthropocene.¹ In the Anthropocene, it is human activities that are the main factor determining the future of civilization. Climate change is a wicked problem² that threatens the continuity of life. According to the analysis of 11,944 scientific papers, written by 29,083 authors and published in 1980 journals, there is over a 97% consensus on anthropogenic global warming (Cook et al. 2013). The importance of climate is clear for humans as we need food, fresh water, fiber, timber and protection from hazards to survive and thrive. Climate influences crop productivity, disease, water scarcity or availability, and vulnerability to hazards (Sachs 2015).

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The effect of human activities raises significant questions for societies and their education systems. Increasing signals of ecological, cultural and social crises provokes questioning about current thinking, learning and behaviour. In the context of the Anthropocene, we need to learn what is necessary and what is possible in order to build a sustainable future. The key issue for education in the twenty-first century is how 9–10 billion people will be able to make life dignified on a finite planet. As John Dewey said, ‘The conception of education as a social process and function has no definite meaning until we define the kind of society we have in mind’ (Dewey 1915).

Our traditional world view is human-centered. Since the 1600s, people started to understand the Earth as a giant reservoir, which secured energy and raw materials for human consumption. It was the beginning of a misunderstanding: people thought resources were limitless and inexhaustible, and thus began an alienation from the web of life. In recent decades, social harmony has been pursued by increasing consumption. Inflation, public debts and private loans have enabled us to increasingly use resources that do not exist. With the help of these resources, we have taken natural resources from the mines, forests and fields to make more and more commodities for human consumption. Together with cheap fossil energy, mass consumption has become a new normal in order to pursue a *good life*. Due to globalization, the consequences of mass consumption have not been very visible. Climate change is a symptom of severe unsustainability and an alarming signal: there is an urgent need for a change.

Our acts have socio-ecological impact. Every act matters, whether we see it or not. The thoughts, words and acts construct the social reality we are living in. The cultural norms, values and taboos are all implicit in culture. However, we can choose what we think about climate change. We can choose what kind of life and social reality we want to construct. The collective apathy and despair can transform to hope through collective experiences.

In this article, we define features of climate change education. We consider climate change as an example of the wicked problems in the era of the Anthropocene. We ponder what kind of societal and cultural transformations, thinking and learning are needed. Our main question is, how could we educate people for transformation towards a sustainable future? The following questions for education have also guided our thinking:

(a) What kind of holistic change in thinking and action is needed for the construction of hope and of a sustainable future? (b) What kind of pedagogical approaches do we need for the construction of hope and of a sustainable future?

We start with illuminating the critical illusions of western culture and to where we need to step forward towards a sustainable future. Then, we offer practical approaches for climate change education to support the holistic thinking and learning we need in the Anthropocene. We end with pedagogical recommendations and a summary of the basics of a holistic approach to climate change education.

TOWARDS A SUSTAINABLE FUTURE

In the Western world, the progress of society is measured by quantity of capital flows. Financial goals are often put ahead of life values. The pace of life is getting faster and faster because the common assumption is 'more is better.' This has negative impact on both life satisfaction (which is one's cognitive appraisal of one's life as a whole) and climate change.

However, what humans require for happiness is life satisfaction as well as the health and well-being of our children, families, communities and natural environment. This is possible to realize in sustainable and resilient societies, comprised of personally fulfilled people, who use their potential fully for individual and common good and create sustainable solutions based on a socio-ecological understanding (Fadel et al. 2015, p. 7).

Combating climate change requires critical analysis of the reality we are constructing, and reflection on the roots of the problem including human—nature interdependency, individualism and consumerism. The perception of the problem frames possible solutions. We argue that there is a need for systemic thinking and widening the modern concept of knowledge to different ways knowing and holism. Apart from ecological, societal and cultural aspects, there is a need to address the issue of social change and the wicked problem of emotional and cultural denial of climate change. Emotional, somatic and embodied knowing are crucial aspects for mobilizing and engaging people for social change.

From Materialism to Post-materialism

Consumerism is a global trend and is strongly linked with climate change. However, mass consumption is widely considered a desirable

goal, because it promotes economic growth. People rarely try to define how much is enough or how much is too much—they simply want to get more. This is an irresponsible search for short-term benefits without concerns for long-term consequences.

In the bigger picture, transforming societies from consumerism to sustainability is a more important issue to address than the control of population. For instance, a child born in the Western world will stress the Earth, causing as much environmental damage as 15–150 children born in developing countries (Ehrlich and Ehrlich 2004, p. 115). The global population is projected to reach 9–10 billion in 2050, but is projected to remain approximately the same in 2100 (UN 2013).

Ambivalent materialism:

Citizens of industrialized countries have reached material individualism that poses a threat to their own subjective well-being as well as environmental, economic and social sustainability. In these overdeveloped countries, people who pursue happiness through material gain tend to feel worse, which is related to negative appraisals of their life satisfaction (Roberts et al. 2015). Unprecedented consumption levels are problematic in overdeveloped countries, where the culture of ‘having’ is dominating and consumption is based on desires and wants instead of real needs. For example, consumption-based carbon dioxide emissions per person in Finland are the highest in Scandinavia and 9th highest globally (Caldeira and Davies 2010). Poorer countries, however, must have the right to develop fast to fulfil their citizens’ basic needs.

Material prosperity is already becoming a barrier to the subjective well-being of people living in high consumption societies. People who prioritize prosperity and goods tend not to be satisfied with their life (Boyle et al. 2008). They experience less happiness and life satisfaction, have fewer pleasant emotions such as joy and contentment, and more unpleasant emotions such as anger and anxiety. They also tend to be more depressed and anxious. Even physical problems like headaches, stomach-aches and backaches as well as use of substances are associated with a strong focus on material values (Dittmar et al. 2014). Thus focusing on material wealth tends to neglect well-being problems, such as stress and fast pace of life, depression, loneliness, and ecologically destructive behaviour. Furthermore, weakening social relationships drive people to work and consume more (Bartolini 2014; Pieters 2013). Paradoxically, increased opportunities to spend more causes an inability to enjoy things obtained with money (Quoidbach et al. 2010).

Post-material well-being:

Universal basic needs are fresh water, food, shelter, healthcare and education. What do we need more of and what less in order to increase our life satisfaction and subjective well-being on a finite planet? What should we pursue, when our basic needs are already fulfilled? The importance of material things decreases, when people reach more social capital—a form of capital that cannot be traded in markets and is not captured by monetary measures.

Shifting from materialism towards post-materialism means fundamental thinking and behaviour changes. These changes have multiple benefits as they improve subjective well-being. Yet what is most important is that they are necessary for human survival on a finite planet. Ronald Inglehart (1977) called a re-orientation from materialism to post-materialism a ‘silent revolution’ which is already occurring in Western societies. This paradigmatic shift towards full humanness was also described by Maslow (1954), Allardt (1976) and Schwartz (1992). See Table 11.1.

Post-material values emphasize human relationships and the meaningfulness of people’s unique lives, including trust, community resilience and participation in the life of society as well as establishment, and flourishing of civil rights and personal expression (Inglehart 2008; Jackson 2009, pp. 143, 181–182; Nevarez 2011, p. 39). In everyday life, post-material behaviour means that the importance of ownership has decreased, services are used instead of owning goods and renewal of goods is motivated by real needs (Salonen and Ahlberg 2013, p. 385). Post-material values are growing in the countries where “a given generation grows up under conditions that permit it to take survival for granted” (Inglehart 2008, p. 145). Their basic needs are easy to fulfil.

Activation of post-material values has wide-ranging positive effects. Increasing post-materiality might not only result in the stability and

Table 11.1 Value shift from material values to non-material values

| | <i>Material values</i> | <i>Non-material values</i> |
|------------------|--|--|
| Inglehart (1977) | Materialism | Post-materialism |
| Maslow (1954) | Physiological needs and safety needs | Social inclusion and needs of love, needs of esteem and achievements |
| Allardt (1976) | Having | Loving and being |
| Schwartz (1992) | Security, conservation, self-enhancement | Openness to change, self-transcendence |

recovery of socio-ecological systems but also increasing health and happiness of people. At best, post-material values produce a culture of trust, which supplies future generations with opportunities for a good life (Dittmar et al. 2014).

*From Segregated Knowing and Cultural Dichotomies to Holism
and Understanding Interconnectedness*

Our situation is not comparable to anything in the past. It is impossible, therefore, to apply methods and measures which at an earlier age might have been sufficient. We must revolutionize our thinking, revolutionize our actions.... (Albert Einstein 1948)

Climate change is a *wicked problem*: it is a huge, complex and systemic challenge and difficult to clearly define (Incropera 2015). Climate change is scientifically apparent, but it presents great scientific, economic and social complexity and uncertainty; solutions have unforeseen consequences. Different stakeholders provide conflicting information related to climate change, its relevance and impacts. Climate change produces profound ethical issues and lack of agreement on what the problem is, what the causes and consequences are and possible solutions that might exist. As a global issue, the implications and solutions need to be reflected both locally and globally. In addition, the challenge of maladaptive behaviour, the cultural and emotional aspects of climate change make it difficult to find efficient solutions or predict the results (Incropera 2015).

Climate change is a hyper, super wicked problem that cannot be solved with scientific knowledge, linear, mechanistic or analytical thinking alone (Kagawa and Selby 2010). Previously, the environmental problems people faced were much more local in character. If one factory runs its wastewater into a river, the river and lake nearby were polluted. The cause and the consequence were easy to recognize. Today's global environmental problems are complex mixtures of global, local, ecological, political, economic and social dynamics (Incropera 2015). Understanding and identifying the global and local perspectives and other interconnected phenomena demand new strategies of learning and thinking. Linear, fragmented modern thinking is not working in the context of wicked problems.

Modern dichotomies as roots of wicked problems:

Today's prevailing thinking has origins in modernism. Modern thinking is based on dichotomies such as nature-culture, human-animal,

global-local, subject-object, mind-body, ration-emotion and individual-social to mention the most problematic dichotomies fostering unsustainability. These modern dichotomies guide our problem solving strategies and management of life, how we relate with the world and how we perceive relationships between things. Dualistic thinking has resulted in linear, atomistic, fragmented thinking, ignorance of holistic relations and the exclusion of opposites from mental frames. We used to think our daily lives and the world around us fit into separate silos, which allowed us to solve our problems with fragmentary knowledge. This thinking has resulted in the geological era of the Anthropocene.

Awareness of interconnectedness has been missing at societal and academic levels. Natural and social sciences are inspecting the world from totally different perspectives, with distinct methods and concepts. Thus transdisciplinary research is almost impossible as researchers speak distinct languages. At the societal level, environmental, economic and cultural affairs are separated into different institutions. At schools organized into subject-oriented structures, teaching environmental issues is traditionally the domain of natural sciences and the human perspective and societal understanding is missing (Aarnio-Linnanvuori 2013). The holistic, systemic understanding of the world has thus been lacking.

Advertising, globalization and digitalization are accelerating separation from our vital web-of-life. Globalization has distanced us from the Earth's ecosystems; we can't perceive the eco-social consequences of our behaviour. Technology has created an illusion of boundless material and digital opportunities in 'any' world, virtual or real. The capitalist mode of mass production and consumption of technology is boosting unsustainable development (Snaza et al. 2014) by provoking effectiveness, competition and product-thinking. But we are not driven to sell nature as a product in the same way, preferring to sell ourselves and our identities. Neoliberalism, capitalism, globalization and digitalism interfere in our lives, our schooling and education and have impact on how we see, value and name things arising to ideologies that intensify modern dualisms and segregated thinking.

The problematic modern dichotomies and climate change (Fig. 11.1).

Global—Local Dichotomy:

Climate change is an issue without borders, yet the impacts vary locally. The relationship between global and local is thus complex because the relationships between causes and consequences are dynamic and unstable

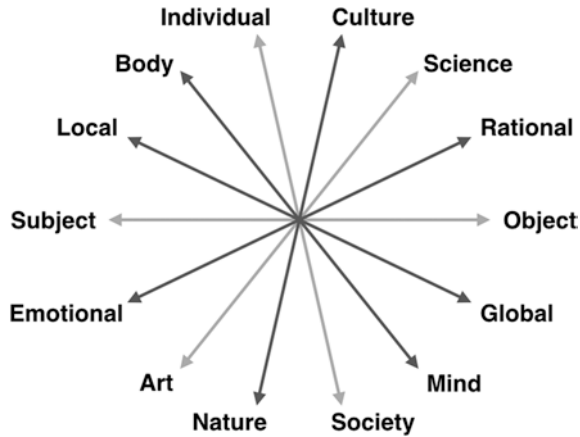


Fig. 11.1 Problematic dichotomies of modern thinking

and the question of responsibility is politically sensitive. There is a need for new kinds of theoretical concepts and knowledge about the interactions and relationships of various elements. What is especially needed is sensitive and empathetic understanding of people's perspectives in different localities. This means that in order to manage our own society and economy, we need to account for other societies and economies, as well as our actions that have global consequences. What people do, for example in the periphery of Finland affects individuals in other areas, even in other peripheries.

So, how are the local and global are connected? The global economy is a clear connector. For instance, a supply chain analysis by the researchers Womack and Jones followed a can of cola bought in London to illustrate the complexity of global markets. Bauxite, an aluminum ore is a key ingredient of the can was mined in Australia. Ore was transferred with trucks to a chemical reduction mill where it was cleaned. After that, ore was shipped to Sweden in a journey across oceans that took two months. Once in Sweden, 10 meter long aluminum rods were processed in a smelter. The rods were sent to Germany where they were heated and pressed into a thin sheet of aluminum. Coils of aluminum were shipped to England, where the aluminum sheets were formed into cans. The cans were then washed, dried, coated, and transported to a bottler. Meanwhile, sugar canes, farmed in French farms, were refined to sugar and shipped to England. Cola also contains phosphoric acid derived from

a mine located in the United States. This mine uses energy equivalent to 100,000 people consumption of energy because food grade phosphoric acid requires a high degree of processing. Cola also contains caffeine that originates from a chemical factory nearby. Cans filled with cola are packed in cartons which are made of cellulose in a paper mill. The paper mill sources trees from Siberia, Sweden and Colombia. Finally, the cola cartons were transferred to the supermarket in which they were sold to consumers, usually within in three days. The average consumer drinks a can of cola in a few tens of seconds. The manufacturing of the can is more expensive than the liquid inside (Womack and Jones 2003).

Nature—Culture Dichotomy.

Climate change is the first radically systemic environmental problem humans have encountered and one that proves that social and ecological systems are interconnected. All ecological and human systems are implicated and are being or will be affected by the consequences of climate change in the short, medium or long term (Gonzalez-Gaudiano and Meira-Cardesa 2010, p. 17). The illusion that humans are apart from nature is no longer tenable. It has led to a belief in human superiority and the subsequent right to control, use and benefit from nature which enables overconsumption. The binary opposition of human and biosphere is threatening to destroy human existence, for it not only allows the exploitation and destruction of flora and fauna, but it also sets humans against nature itself—nature is a resource waiting to be mined and exploited without regard for sustainability or the quality of life on the planet.

The future of coral reefs offers an example of complex socio-ecological systems and the need for systems thinking. As sea water warms and absorbs carbon dioxide, water becomes increasingly acidic, resulting in damage to vulnerable marine ecosystems. If the current trend continues, the first full ecosystem—corals—will extinct by the end of this century. It is an ecological problem, which also results in large-scale social challenge as 250 million people receive their daily food from coral reefs (Sale 2011). Without food, life is impossible and people will be forced from their homelands. Environmental migration affects the structures and stability not only of the countries of origin but also countries where immigration is directed. This poses risks to the peaceful co-existence of people.

Global warming is also one of the greatest challenges to social justice (World Bank 2012) and as a result, many countries have already included

climate change in their security strategies. Poor people suffer the consequences of climate change the most, even though their way of life causes lower greenhouse gas emissions. Food, housing and mobility for the world's richest tenth of people produce 50% of global carbon dioxide emissions (Tukker et al. 2006). It is evident that a shift is needed toward understanding the nature—culture relationship; a new orientation integrating social and ecological concerns (Hirvilammi and Helne 2014; Norton 2005).

Rational—Emotional Dichotomy:

Climate change undermines the modern idealization of human rationality. In the Age of Human (Anthropocene), we are living in a fluid reality of natural conditions and existential threat. From a psychological perspective, human dependence on nature threatens the illusion of human autonomy and omnipotence (Lehtonen and Välimäki 2013). Denial of the existence and relevance of climate change or human, social or individual responsibility is still commonplace. Many deny the fact that consumer-based lifestyles are in crises and need to change (Norgaard 2011). People tend to see a temperate climate as preferable and/or rely on optimistic myths deriving from the Enlightenment: the future will always be better and of our species has known how to overcome other critical moments in the past (Gonzalez-Gaudiano and Meira-Cartea 2010).

The modern idealization of rational thought has led to a restricted understanding of human behaviour. The ideal of pure rationality has isolated knowing from emotions and thus fosters an instrumental attitude toward the world. The representation of nature as a resource is strong even in the field of Education for Sustainable Development (ESD) (Selby 2010). By presenting climate change as curable with current systems and tools limits focus on the human dimension and the crises arising from the disconnect between humans and the biosphere. Climate change education is often focused on developing a scientific understanding of the phenomenon, technological solutions and a more benign form of consumerism; thus the ethical dimension of climate change tends to remain rhetorical. The critical aspects of our humanity—and how they are threatened by our own actions—are largely ignored (Selby 2010).

The culpability of our behaviour in the looming climate crisis challenges most curricula and pedagogies. Education and schooling has traditionally focused on cultivating rational minds while emotions and the body as a component of learning have been neglected

(Selby 2010, p. 38). In addition, despite the imperative to educate active citizens, students are often not treated as individuals with free will (Wolff 2011, p. 99). Educating active agency is often realized only in rhetoric as the need to control has prevented student-centred learning (Rainio 2008).

Climate change is a hybrid theme essentially founded in uncertainty and thus requires the combination of both intuitive and rational understanding. It impossible to control or even identify all the relevant variables and to know how these are linked to each other (Gonzalez-Gaudio and Meira-Carda 2010, p. 14). It is almost unachievable to make predictions and move from the global scale to regional and sub-regional knowledge in the context of climate change. In addition, emotional literacy and empathy are needed to find efficient local solutions to a global problem.

Mind—Body Dichotomy:

Cartesian dualism—understanding the mind as separate from the body—is indirectly influencing our behaviour and is partly to blame for the destructive over-consumption of the Western world. The bodily connection of Western people has weakened because marketers, whose tools are enhanced by digitalization, strengthen the confusion between needs and desires. We are affected continuously by advertisers working through all medias and the net effect is individuals don't know what they need or what is good for them.

Scientific knowledge built from a tradition of objectivity and empiricism has also furthered the neglect of embodied knowing (Gonzalez-Gaudio and Meira-Carda 2010). People are told not rely on perception, senses, embodied, intuitive or emotional knowing but, scientific research-based information. The predominant belief is that scientific knowledge is the sole source of the truth and those empowered by science tend to know better what is needed than the average citizen.

The positivistic ideal of objective, value-neutral knowledge has dominated the natural sciences which rely on a materialistic ontology—everything is understood to be measurable—in the pursuit of stable and generalizable knowledge. In the social sciences, the ideal of objectivism—stable, objective knowledge generated from positivistic research—has enhanced the gap between theory and practice. Objective knowing has been isolated from and independent of the experiencing subject (i.e., the person observing and knowing). The modern ideals of objectivity and

rationality have disconnected us from values, embodied and emotional knowing. How we perceive, receive or reject the messages of our environments, our bodies and emotions should have focus in education.

In this section, we have looked at the modern dichotomies of nature—culture, rational—emotional, mind—body, and local—global. The following section “[From Knowledge and Rationalism to Holism, Intuition, Embodied and Emotional Awareness](#)”, deepens the discussion of the interconnectedness of rational—emotional, and mind—body. The rest of the modern dichotomies not yet clarified, but crucial from the perspective of climate change education are opened and analyzed in later sections. Individual—social is critically evaluated in the context of individualism (“[From Individualism to Creative, Collective Collaboration](#)”). Art’s relationship to science is discussed within the section about Art-based education (“[Art-Based Learning](#)”). And in the end of our chapter, our pedagogical recommendations reveal our meta-model of interconnectedness—the ultimate aim of climate change education.

From Knowledge and Rationalism to Holism, Intuition, Embodied and Emotional Awareness

Facing crises like climate change promotes existential questions and critical reflections such as: do we have a future? Why are we here? What is the meaning of the life? Climate change could have a great potential for transformative learning and promote reevaluation of value-hierarchies. But reflection on climate change naturally evokes intense feelings (Naess 2008, p. 35), which are not easy to manage. Nevertheless, emotions, embodied and intuitive knowing have remarkable value in our search for vital knowledge for survival.

How we react and handle our emotions and listen to our bodies, is largely a cultural question. Eco-anxiety might explain indifference and other difficulties coping with climate change and imagining the future, which might result in the denial of climate change. Instead of not caring, people might in fact care too much, and resort to psychological defenses or paralyzing anxiety, apathy and helplessness (Weintrobe 2013; Pihkala 2017).

Emotions link the inner and outer reality; they are signals, connecting us with values (Nussbaum 2003). There are no good or bad emotions, but the difficulties of coping with challenging emotions easily leads to

becoming disconnected from the source anxiety. Nevertheless, by listening to emotions and our bodies, we can know what is good for us and what is not and we can connect with our needs, emotions and values. Ignoring the signals of our bodies and suppressing emotions leads to stress and illness.

“What is good life, goes primarily through emotions” (Naess 2008, p. 23). Information becomes alive and meaningful, if we experience it with our bodies (Snaza et al. 2014). The experience of our existence—being alive—is located in our body. Our identity is strongly embodied in our bodies: how we see, react and feel; our emotions are manifest in our bodies. Through sensory experiences, we can sense the connection with other people and with nature.

How can we engage learners in processes that is both liberating and empowering? We need to develop emotional literacy in education that helps pupils face anxiousness and emotions in a constructive way. In order to do this, we need to find ways of facilitating learners’ abilities to name and frame their own ideas and concerns about future, and their positionality and potential for change (Wayman 2009, p. 95).

Emotions need time and space:

Challenging emotions can have functional value. Positive feelings and emotions activate us while negative, challenging emotions can stop us or prevent action. Aggression and other negative feelings are necessary to motivate behaviour change and action. Expression and reflection on challenging emotions such as sorrow, grief and anger can promote consciousness of crisis, awareness of the borders of sustainability and the need to change. When given space and support, facing challenging emotions and using them in a constructive way can result in empowerment, motivation and activating feelings of joy (Naess 2008, pp. 78–79).

Climate change presents a peculiar problem for our emotions. In order to cope with shock, uncertainty, change and then adapt to a new situation, individuals need social support and should not be left alone when facing crises. However, there is a real danger of emotional manipulation or transference when teaching about climate change (Österlind 2012). Becoming worried about cynical and careless attitudes toward the environment can threaten an individual’s sense of security and frighten them with visions of an apocalyptic future. However, it is important that an emotional response to climate change should not be forced or coerced. The emotional response must have time and space for expression and critical reflection either individually or collectively.

Empathy promotes caring and awareness of connectivity:

Ethical thinking and behaviour is strongly linked with empathy. We care for the things to which we are personally connected. We need to experience this connection with other people and nature in order to become motivated to take care of them (Martusewicz et al. 2014). Empathy promotes understanding about external realities and, therefore, enables the possibility of greater connectivity. Global awareness and collective solutions for climate change require empathic understanding of people's need in different localities and caring for people especially vulnerable to climate change.

Empathy builds on self-awareness. The more open we are to ourselves, the more we are able to understand other people's experiences (Goleman 2006, p. 96). Having emotional connectivity with other people and other living creatures can increase one's awareness of purpose and meaning in life. Caring acts and taking responsibility, building initiatives for sustainability all enforce positive feelings, a sense of identity and, therefore, subjective well-being. Thus, a value-oriented life marked by contribution can be highly satisfying and motivating, and deepen one's sense of purpose. Understanding interconnectedness with nature and other people can promote hope.

Hope is a virtue, a habit of finding meaning and resilience, and not giving up (Orr 2009, p. 182). Constructive hope is the ability to see something meaningful and promising after encountering a challenging situation. It is based in part on trust in other people working toward the common good and trust in one's own ability to influence problems in a positive direction (Ojala 2012; Pihkala 2017). Educators and leaders have an important role in promoting constructive hope by demonstrating a caring attitude, and manifesting caring in practice, even in the face of collective denial about the criticality of climate change (Lehtonen and Välimäki 2013; Pihkala 2017).

To conclude, the whole spectrum of emotions and feelings, caring and careless attitudes—the entire emotional range—should be given space for expression. All opinions and taboos, the questions not often asked and even denialist attitudes should have the right to exist and be expressed. One way to foster emotional expression is the experience or production of art. Arts-based learning situations naturally offer a space for sensory, bodily experiences for emotional self-reflection and expression. The transformation towards empowerment is often enabled by

connecting with challenging emotions explored through art. Listening, being present and in dialogue, emotional expression and small acts of caring are the most efficient assets of climate change education; they help combat apathy and denial.

In a broader sense, this means that rational ways of thinking need to be enriched and guided with intuitive, embodied and emotional awareness, the direct knowing of the vital conditions for human existence. Nowadays rationality is seen as ‘instrumental and interpreted in relation to technical considerations, within a strict economic framework, related to short-term not to ultimate values’ (Naess 2008, p. 88). Arne Naess (2008) suggests that the goals of rationalism should be deeply examined. Rationalism should correspond with the fundamental values and aims of our lives. Spinoza describes ‘ratio’ (reason) as an inner compass that points in a direction that is consistent with the active emotions and in harmony with humankind’s nature or essence (Spinoza/Naess 2008, p. 86). Conscious rationalism can drive humanity towards constructive hope and sustainability in the Anthropocene.

From Individualism to Creative, Collective Collaboration

Increasing individualism is among the most significant cultural changes society has faced in the last few decades (Hofstede et al. 2010, pp. 414, 473). More individuals have attained possibilities for self-expression and choice than ever before in modern history. Increasing individualism is related to the pursuit of one’s self-interest and material life goals (Kasser 2011, p. 207). It is linked to the disintegration of society and a lack of solidarity. In industrialized countries, people no longer require assistance from their community to ensure their basic needs are satisfied; independence is easier than ever.

According to some interpretations, the roots of individualism and pursuing self-interest originate as early as the Middle Ages. In the thirteenth century during the confrontation between the Christian and Islamic worlds, the elites within the church debated the nature of the soul; whether it was individual or social, possessing free will, with self-interest and ethics. Not until the eighteenth century did a deeper understanding of human subjectivity emerge, redefining the relationship between people and nature around notions of desire and self-interest (Yrjönsuuri 2013). The debates initiated in the Middle Ages are again relevant nowadays in the context of climate change.

Capitalism necessitates and provokes competition between individuals. Our current mode of capitalism, neoliberalism, drives for maximum profit above all other considerations, which leads to ever greater individualism and competitiveness. A competitive global culture that works toward economic efficiency and productivity works against pursuit of the common good (Marglin 2008). Individuals are driven to compete for power and ownership and are expected to *sell* everything, even their thinking and identity. When valuing things mainly instrumentally or with money, even meaningful things such as relationships become meaningless; joy becomes diluted as nothing is sufficient.

Living communally, working for the interests of other people, giving and sharing makes people happier than receiving, sparring and living in isolation (Helliwell 2014, p. 81; Minkov 2009). Humans are on the whole social animals, and thus want to share their lives with other people. This necessitates connecting people with each other. For instance, helping other people by donating money for charity makes people more happy than using money for their own purposes (Dunn et al. 2008). Subjective happiness increases by actions for solidarity.

Climate change is a common problem that connects people locally and globally:

Who owns the solutions and knowledge needed for mitigating global warming? Encountering climate change necessitates collective thinking and collaboration. The solutions to this common global problem lie in supporting connections, not competing for benefits or controlling others. Increasing individualism has induced counter-forces to commons-thinking and open-access principles.

Individualism is often seen as problematic from the perspective of climate change. Climate change is a social problem, a problem of communities. The problem lies in the interpretation of individualism and the perception of individual benefit. Combating climate change works towards both individual and common benefit. Paradoxically, individualism—pursuing individual needs and interests over the long term leads to thinking about the common good; caring for the self is necessary to be able to care for others.

Collaboration develops and broadens thinking:

Our reaction to climate change is socially constructed. Apathy is a rational and common reaction to climate change, if there is nowhere else to turn. We need real solutions and options to act. To break through the

prevailing culture of denial of the existence, meaning or obligation of climate change, collaborative action and participatory problem-solving and learning through dialogue is needed. We need to reflect together, how we see the problem and its possible solutions. The rationale and possible answers are dependent upon collective recognition and emotional reaction (Norgaard 2011).

We need collaboration to flourish and enrich our thinking, to have more alternative visions that can be challenged from different perspectives. Sharing the experience of crisis, motivation for change, joint action towards and belief in a better future promotes hope (Ojala 2012). Real, authentic hope becomes embodied in collective action, which enables us to experience our connectedness and explore the meaning of life. Education for transformation towards sustainability should be a collective process where people working together create stories about a future with hope.

To conclude, the common good is good for individuals as well. In the Anthropocene, education must be aimed at increasing understanding of the common good and human interdependencies. Successful solutions will require discovering, respecting and responding to people's real needs (Kenrick 2009). We must cope with the illusion of autonomy, individual freedom and the psychological denial of interdependence (Weintrobe 2013) to encourage social learning and empower collaboration. We must transform individualism towards a focus on the common good because awareness of connections deepens and widens meaning and our perspective on life. However, individualism matters still: framed by post-materialism, individualism may lead to personal empowerment and an increasing sense of responsibility on personal, social and societal levels.

CLIMATE CHANGE EDUCATION IN PRACTICE

How should we educate people for society's transformation toward sustainability? In this section, we describe the pedagogical aspects of changing in thinking and behaviour. We consider how the needed change in thinking and behavior can be supported by learning and teaching, and what kind of pedagogical solutions can be found in order to build a future that will inspire confidence and trust. We present practical solutions for climate change education starting from an eco-social approach to education, which has been introduced as a foundational value in the new National Curriculum of Finland (2014). Then we move on

to art-based education which we believe has great potential for climate change education as a holistic, embodied, student-centered approach which enables the integration of rational, emotional and intuitive ways of learning. In the end of this section, we explore the debate about a holistic approach to teaching and learning—phenomena-based learning—which integrates knowledge of different school subjects together with art and science, and which necessitates collaborative learning and student ownership.

The Eco-social Approach to Education

Society cannot be constructed on short-term economic requirements. After all, a final breach of planetary boundaries means destruction of the economy. If natural resources, ecosystem services, and human beings are the only instruments for market growth, our debt to future generations will grow, and our ethics will be undermined. Thus, there is a hierarchy between ecological, social and economic elements of human well-being. It forms a science-based framework for human activity (Salonen and Konkka 2015):

1. The viability of ecosystems and the sustainable use of natural resources determine success and possibilities of society and the economy. The ecosystem possesses an absolute character—intrinsic value.
2. Implementation of human rights (justice, equality, democracy, cultural diversity) determines success of the economy. Human rights represent intrinsic value and apply under all circumstances.
3. Markets are an instrument for achieving well-being, not an end in of themselves.

The above hierarchy is the foundation of the eco-social approach to education. It does not deny the possibility of economic growth, but it determines two conditions for the growth: taking care of ecological boundaries and profound respect for human rights (Salonen 2014). Eco-social education has been introduced and implemented in the core values and overall framing of education's purpose in the new national curriculum of Finland that became law in 2016. The eco-social principles will guide the integration of instruction and the implementation of cross-curricular themes within the Finnish curriculum. According to the

curriculum, eco-social principles should direct the development of the working and operational culture of the school. The transformation of value principles; the implementation of eco-social thinking necessitates trust, respect, and open, integrative and interactive discussion within the school communities (Finnish National board of education 2014).

Modern societies are characterized by flexible, creative, adaptable, well-informed and inventive communities, which are able to respond generously to each other (Wilkinson and Pickett 2010, p. 270). According to Abraham Maslow (1960, p. 118), the ultimate goal of human growth is fully realized humanity which highlights altruism, dedication, and the ties to other people and society. To solve the wicked problems of the Anthropocene, we need education that revolves around sensing and actualizing the good and full potential in students. Simultaneously, we will reach life satisfaction and subjective well-being because true abiding happiness cannot exist while others suffer. It comes from serving others, living in harmony with nature, and realizing our innate wisdom and the excellence of our minds. The teacher's role is to act as the conductor and orchestrator of the highest creativity and goodness found in their students. She or he aims at providing learners with the chance to achieve their highest future potential as human beings, to have access to their best sources of creativity (Scharmer and Kaufer 2013, pp. 211–212).

What we want to see is nothing less than transformative-graduates who are genuine human beings, realizing their full and true potential, caring for others—including other species—ecologically literate, contemplative as well as analytical in their understanding of the world, free of greed and without excessive desires; knowing, understanding, and appreciating completely that they are not separate from the natural world and from others—in sum manifesting their humanity fully. (Thinley 2009)

Eco-socially educated people understand that human beings are part of a fragile planetary entity. They question consumption and ownership-oriented lifestyles in the pursuit of a *good life*. They recognize planetary boundaries and replace material goals with immaterial elements that produce long-term satisfaction, enhance the quality of life and provide experiences of happiness. They are aware of the fact that once people have met their basic needs, their well-being is grounded in immaterial capital (Kahneman and Deaton 2010). They understand the value of cooperative relationships and generosity,

and the fact that immaterial capital—knowledge, self-expression, freedom, affection and participation—can grow forever without any boundaries. The best experiences of life are not related to goods, but to other people. When a good life is sought by maximizing social capital, well-being is increased without negative ecological effects.

Art-Based Learning

Throughout history, art has had a strong role in societal and cultural change. Art can provoke, unveil and deconstruct cultural perceptions, hidden norms, and illustrate taboos (Löytönen and Sava 2011). For combatting climate change, there is an urgent need to unleash the artistry, creative potential and emotionally engage every human-being in visualizing and acting out a vision of sustainable well-being. Arts can transform apathy and grief into joy and empowerment and bridge the gap between theory and practice. The concepts of sustainable development or a sustainable future can be re-embedded into the world and the practice of living by art-based learning (Ernstman and Wals 2013).

Arts can offer a space and provide means for the critical issues of climate change education through emotional involvement, personal meaning making, critical thinking, active agency and creative visioning (Lehtonen 2012; 2015a, b). Arts widen the traditional ways of knowing as the rational, intuitive and embodied knowing are naturally co-operating and integrated in arts-based learning processes. Rational thinking can be enriched with imaginative, un- and preconscious material and, vice versa, scientific knowledge can serve as inspiration for artistic learning and investigative processes. Different artistic approaches and art-based methods can play an essential role in enabling education to support the cultural transformation necessary to achieve sustainability.

Contrary to objective, infallible, generalizable knowledge, art's way of knowing is subjective, embodied, emotionally loaded and engaging (Anttila 2011; Rouhiainen 2011). Appreciating one's experiences, emotional excursion and subjective processing of things is at the core of art education. Making art can have a positive impact on self-consciousness, identity construction and can strengthen empathy. Empathy and creative thinking are needed for understanding the world in its multiplicity. In the aesthetic world of art, especially in drama, participants put one's soul into other people's experiences allowing them to try out different conditions in different contexts (McNaughton 2006, 2010).

Arts aim at widening perspectives, seeing things differently and exploring alternatives. Art's perspective to the world is dynamic. Even when watching art, not only the artist but the spectator participates actively, thereby constructing and imbuing meaning in the art. Transformations and transformative learning can take place on many levels during artistic processes. Participatory art challenges the norms of roles and identities; the idea of normality itself transforms. Individual perspectives can transform: they are enriched through dialogue and encounters with other people and their context. Evocative images and ideas are reflected in artistic action, and transformed into artistic products or performances (Lehtonen 2013). When there is an open space for expression, humour and dialogue, even social transformation can happen—resistance can be transformed into active agency (Rainio 2008; Lehtonen 2015a).

Climate change is a wicked problem that suits artistic learning: Conflicts and tensions are optimal starting points for creativity. Emotional response can serve as inspiration for artistic expression and is involved in learning (Österlind 2012). Openness and uncertainty can be faced and managed through artistic processes. Art provides a pathway towards transformation in practice: an artist, thrown into wonder, de-familiarized and shaken up, open to the familiar becoming unfamiliar (Boeckel 2014, p. 380). Learning via the arts necessitates an ability and willingness to surrender to unanticipated possibilities, which are essential to educating for an uncertain future.

Collaborative art can address the challenging goals of climate change education through building a vital understanding of interconnectedness and the skills to cooperate, employ critical thinking and creativity. Creative collaboration can either focus on one form of art or integrate different forms of art for developing a performance, depending on the group of students or participants. Artistic process offers a space for creative inquiry of the physical and especially social reality created by different ideas, attitudes, opinions and interpretations. The critical questions of our time can be explored through creative action by making a collective piece of art, a play, a performance, dance, film, or by writing a poem or lyrics for a song, etc. A good sense of humour about tragedy can provide relief and even be empowering assets in the face of ignorance or apathy (Pihkala 2017).

Creative collaboration is a student-centered process: Collaborative learning is student-centered by definition because student perspectives are naturally activated and participants' ideas guide the

learning process. Creative collaboration can start from anything, but the teacher needs to set the frame for the working process. Integration of art into critical thinking and self-transformation demands concentration and applying effort to collective and individual reflection on thoughts, ideas, experiences and sensations. Furthermore, intuitive thinking can arise during the working process.

There are no right or wrong answers or mistakes. Everyone participates on their own level and relates to collaboration with their perspective and their experiences. Every idea is valuable, enriching private and collective thinking (Lehtonen 2015b). Even the phrase, “I don’t have any ideas or nothing comes to my mind” is a good beginning for questioning and then embarking on artistic inquiry about prevailing attitudes. Mistakes can be used as source of inspiration as ideas are tested in practice. Learning through art happens via trial and error (Boeckel 2014, p. 365) because different outcomes become part of the exploration process.

To conclude, exploring and reflecting through art facilitates reflection on interconnectedness that challenges the modern dualistic understanding of the individual and society, nature and culture as segregated entities. We believe that the arts and creative collaboration have unlimited potential for climate change education.

Phenomena-Based, Collaborative Learning

In the multidimensional world of the Anthropocene, coherent approaches to learning are critical. Climate change and other wicked problems, a multidimensional world and a society in transition all challenge traditional learning methods and ideas about learning. Problem-based learning that promotes systemic and holistic thinking is needed in the context of wicked problems because climate change cannot be resolved by individuals acting alone without collaboration. Collaboration is a crucial skill for education for the future and is required of both learners and teachers (Pyhältö et al. 2014).

Towards phenomena-based learning in Finland:

As a case study, we turn to the 2016 Finnish national curriculum which notably breaks from subject-based schooling. Recently, Finnish schools have been criticized for not changing as quickly as the world around them (Berner et al. 2015). The outlook of schools and classrooms might have changed but critics point to the substance and teaching and

learning methods which have not been updated in a meaningful way. This is due in part because within the field of education there have been many ‘-isms’ guiding new practices and reform efforts. In previous decades, constructivism and socio-constructivism have been considered the most trusted -isms generally applied to Finnish schools. Constructivist thinking skills have been one of the key explanations for Finland’s good Pisa results. However, as Finland’s Pisa results slide, current educational debates revolve around questions about subject knowledge and content.

Finnish schools can be described as subject oriented—structured on the basis of division between various sciences and subjects (Sahlberg 2015). Subject-orientated learning segments phenomena into different silos, concentrating learning according to internal logics, theories and observations. In the context of climate change education for instance, the concepts of atmosphere and greenhouse gases would be studied in physics and the interaction between people and the environment studied in geography and taught by experts of each field with qualified conceptual knowledge. A visual arts lesson might create environmental art work while home economics would deal with recycling materials. At best, subject-orientated climate change education gives students a multidimensional picture of a wicked global issue. But without communication between different subject-silos, the critical linkages between different domains that make climate change such a challenging problem might be missed. Fragmented or split knowledge that can result in achieving no deep understanding of climate change is a real concern and limitation when working to develop solutions (Aarnio-Linnanvuori 2013).

Recently, phenomena-based learning has been introduced as an alternative to subject-orientated learning in the new national curriculum of Finland. Although the concept of phenomena-based learning is new to the Finnish system, the ideology behind it is not. Integration of subjects has now become obligatory, but the themes and subjects involved in phenomena-based learning are chosen and planned yearly by each school. The goal is that the students build an interdisciplinary, holistic picture of selected phenomena linked to students’ communities and interests. It is thus expected that studying should be both collaborative and take place in real world environments outside of schools. The learners’ personal experiences, feelings and abilities to communicate together and respect each other are important enablers of phenomena-based learning (Pyhältö et al. 2014).

Studying themes emerging from student interests:

In the Finnish phenomena-based learning process, students are encouraged and allowed to study themes of their own interest. This does not mean that students are free to do and concentrate on whatever they choose; frameworks and guidance are required for learning projects. The method of phenomena-based learning starts with a student's questions about the world around them. Several questions are likely to emerge that can then be listed in 'question cloud.' For example, questions such as: What is our future? How will we live on this planet? What kinds of innovations will we see? How will climate and vegetation change? Will there be hamburger restaurants in the future? After a collaborative reflection and analysis of the questions, the study group together with their teacher select one question to concentrate on. This study question could be related to climate change. For example, 'How will agriculture change within the next decades and what will we eat in 2030?'

After selecting the study question, students and their teacher generate ideas about how to get answers to this question and what kinds of study methods they could use in their study [AR25] process. They could for example study written texts, statistics and previous research, or they could interview farmers or make questionnaires for restaurant owners. The essential aspect of the phenomena-based learning process is that the teacher doesn't prescribe 'correct answers and methods.' Instead, the planning process (i.e., curriculum development) is collaborative. The study question can then be divided into sub-questions addressed by smaller study-groups. Each sub-group of students chooses their methods and design their own working process and schedule within the frame of the overall project schedule (Cantell 2015; Lonka and Mind the Gap Research Group 2015).

Evaluation of phenomena-based learning processes:

An important part of phenomena-based learning is the learning product. Traditionally, learning products are individually written texts and essays or group posters or other forms of presentations. For phenomena-based projects, students are free to create various kinds of presentations and products. These can be videos, art pieces, participatory theatre, portfolios, web-pages, blogs, active project days and so on (a written text can also be generated). The key idea is that new information and knowledge is not only for the sub-group itself but also for the wider public and, therefore, must be communicated. After presenting

and publishing their work, students and their teacher together analyze the original study question and the answers they have developed through the learning process. Next they evaluate what was learned, what new knowledge was gained toward building new understanding, was some important information missing, and how did the sub-groups work (Cantell 2015).

Phenomena-based learning is deeply collaborative: it is an active learning process that develops thinking through communication and shared effort. All learners contribute their expertise, thought and experiences to a collective process resulting in an equal learning situation. Ideas are shared and developed in a relational process; every idea is as important as it enriches the collective understanding of the issue. There are no wrong questions and not just one right answer. The learning product itself is not the outcome of any individual's work, but of the group (Hakkarainen 2010). This collaborative learning model requires dialogue between students, which is often a challenge. Learners have different backgrounds, personalities, knowledge and expectations for learning processes. The key challenge in Finnish schools tends to be motivation; how to inspire students through a learning process where all can participate and feel valuable and respected (Hakkarainen 2010).

Challenges to phenomena-based learning:

There are challenges inherent in the phenomena-based approach. One is fear linked to the role and work of sub-groups of students. The teacher's role is essential as they must conduct, guide and mentor interdisciplinary (or better, transdisciplinary) work. Phenomena-based learning demands conceptual and interdisciplinary expertise or it might lead to a narrow and, therefore, limited understanding of the phenomena. For example, comprehension of the concepts of atmosphere and the impact of greenhouse gases is needed to understand climate change, how it might be managed and populations will need to adapt. Teachers incrementally changing how they teach is generally not enough. They must enable collaborative, integrated learning while building an inspiring atmosphere for learning, encouraging and supporting learners through a challenging process.

Phenomena-based learning demands collaboration between teams of experts, including teachers (Lonka and Mind the Gap Research Group 2015) because collaboration is not just about learning, it is also about teaching (Pyhältö et al. 2014). However, in Finland there is a long

tradition of individual and autonomous teaching (one of the system's most heralded success factors). Sharing expertise and teaching practices is, therefore, unusual in Finnish schools. However, just as in the learning processes outlined above, teaching processes that are collaborative are critical as is true in many other fields. This fact will require significant changes to teacher education to fully realize the benefits of phenomena-based learning.

At best, integrative, phenomena-based and collaborative learning builds systemic understanding of the world. They offer a learner constructive pieces to build a holistic picture of the multidimensional issues facing the world and the interlinkages between them. They give a learner the elements to form her own worldview and learn about what constitutes a good life and well-being together with others. Systemic understanding requires understanding of content areas, but even more requires new learning processes; an essential tool for confronting a changing world.

PEDAGOGICAL RECOMMENDATIONS

The overall aim of education is to create a civilized human being who takes care of himself and his culture, the Earth and protecting possibilities for future generations (Salonen and Åhlberg 2012). In practical terms, climate change education enables students to understand the interconnectedness of planetary elements. Without a well-functioning biosphere, society cannot exist. And without society, there cannot be societal functions, including the economy. The economy is a sub-system of the larger but finite Earth system (Max-Neef 2010, pp. 203–204). This philosophical principle can be made concrete by creating good maxims such as first walk, then bike, then ride. Walking and cycling is better for health and climate. It combines egoistic and altruistic goals of life.

A main principle of climate change education is that taking care of the wellbeing of future generations does not constitute a sacrifice. This is because an individual's interests and the common good can be aligned. While it is egoistic to maximize the relevance of one's own life, it can become a *civilized selfishness*, because knowledge, social prosperity, arts, intellectual capital and increased humanity do not consume the planet's limited resources. Egoism and altruism do not require materiality.

Critical reflection on climate change promotes existential questions: What does it mean to be a human? What is the meaning of life? How are we related to ourselves, other people, nature, societies and the global community? The goal of climate change education is to fully realize our

humanity—a person, who thinks critically with rich information about a wide range of global situations. The person displays an ability to imagine the predicaments of many types of people and think reflectively. Climate change education aims at critical thinking about consumerism, human identity as a consumer, and prevailing ways of pursuing happiness pushed by globalization, capitalism and advertising. Climate change education aims at increasing awareness of interconnectedness,³ post-material well-being, clarifying the goals of education and life as to meaning and purpose (Fig. 11.2).

Climate change education applies systems thinking in order to understand how the world works. According to a rational systems view, it is clear that humans are part of natural systems first, living things second, human beings third, members of society and culture fourth, and particular individuals fifth. Nature and culture should be considered as one, interrelated system. The eco-social perspective helps to understand this interconnectedness and could be applied as the basic principle for all learning and educational practices.

The understanding and response to climate change is socially constructed; each person with a unique view. In order to understand what to do about it, we need to become aware of cultural dichotomies and strive for interconnected thinking and better understanding about how we are connected to each other and nature, how we can reconnect to emotions and our bodies. Active agency can be learned only through

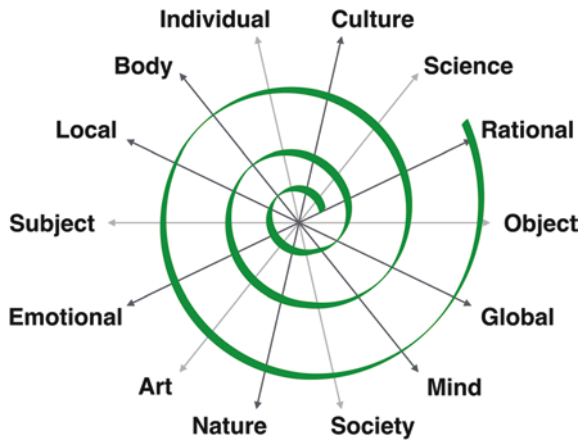


Fig. 11.2 Interconnectedness—the aim of climate change education

practice. Embodied experiences, awareness and emotions are valuable intuitive resources for improving rational thinking, learning and knowing. Reflecting with intuition can connect us to deeper questions of human needs, desires and wishes, values and identities.

It is essential that climate education be based on a scientific understanding of socio-ecological systems and the ethical dimensions of human behaviour. Connections between local and global, between individual behaviour and communitarian practices and climate change need to be identified and illuminated through social experiences. Climate change education should be developed and enriched with contextual, subjective knowing in practice. The resulting dialogical learning situation offers open encounters where adults and young people can learn from each other and together construct pathways for a sustainable future.

Art-based learning is critical to unleash creative potential because it naturally combines different ways of knowing: pre-conscious, intuitive and rational. Arts should be used aside natural and social sciences to deepen the insight into questions traditionally approached only via scientific knowledge. Hope, courage and trust strengthen in embodied, shared experiences that explore alternative visions of a new sustainable reality where humanity is fully realized.

Hope is a pillar of the world. Great changes are possible; even wicked problems can be combatted. For instance, humans managed to stop global ozone depletion, lifespans have nearly doubled in the last century, and a universal education system as well as universal medical care have been achieved in many countries. Now there are several positive dynamics pushing towards a sustainable future such as the pursuit of meaning and purpose, stronger connection to other people and nature, the promise of security and solidarity, and the ethics of taking responsibility for others, nature and the future (Raskin et al. 2002, p. 56). Together, society is becoming stronger. As Margaret Mead once said, 'Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has.'

SUMMARY: BASIC ELEMENTS OF CLIMATE CHANGE EDUCATION

- Our understanding and response to climate change is socially constructed; each person with their own perspective.

- Nature and culture are one entity. The eco-social perspective should serve as a foundation for all learning and educative practices. Active agency can only be learned in practice.
- The global perspective: existing connections between everyday individuals and communitarian practices and climate change need to be identified and illuminated through social experiences.
- Climate change education should be developed and enriched in practice with contextual, subjective knowing.
- Reflection on embodied experiences and emotions, intuitive knowing are useful resources for rational thinking and learning. Reflecting with intuition can connect us to deeper questions of human needs, desires and wishes, values and identities.
- Art-based learning unleashes creative potential and naturally combines different ways of knowing: pre-conscious, intuitive and rational. Arts can enrich and be used aside natural and social sciences to deepen the insight of questions traditionally approached only through scientific knowledge.
- Dialogical learning situations offer open encounters where adults and young people learn from each other and together construct pathways for a sustainable future. Hope, courage and trust are strengthened through embodied, shared experiences.

NOTES

1. Anthropocene is the proposed name for the epoch of human activities having significant global impact on Earth's geology and ecosystems. The term is generally used, but not officially approved by scientific community. The recognized subdivision of geological time is under debate within scientific community. Holocene is the name given to the post-glacial epoch of the past 10,000–12,000 years and Anthropocene would come after that. In this new era of anthropocene, the Age of human, nature is us and earth is in our hands as human activities impact on the environment on all scales. These impacts include the manufacturing of hazardous chemical compounds as well as significant geological forces such as land use changes, deforestation and fossil fuel burning. Humans are outcompeting natural biological, chemical and geological processes (Crutzen [2002](#), [2006](#)).
2. Horst Rittel and Hans Webber ([1973](#)) launched first and defined the concept of a wicked problem with ten characteristics. Ten characteristics of the

wicked problems are listed as follows: (1) difficulty to clearly define—every wicked problem can be considered to be a symptom of another problem; (2) definition and explanations determines the nature of the problem’s solution—different stakeholders have different views of what the problem is and appropriate responses; (3) interdependencies and multi-causality—there may be conflicting goals for those involved; (4) attempts to address wicked problems often lead to unforeseen consequences and even new wicked problems—wicked problems exist in complex systems with unpredictable, emergent behaviour; (5) instability—understanding of the problem is constantly evolving; (6) having no clear solution, no right or wrong response, although there might be worse or better responses; (7) socially complex—it is social complexity, rather than technical complexity, that is overwhelming; (8) no clear responsibility of any one organization—these problems cross governance boundaries; (9) involve changing behaviour—with all the difficulties that poses; and (10) characterised by chronic policy failure—they have become intractable, despite numerous attempts at solutions (Rittel and Webber 1973; Australian Public service Commission 2007; Riedy 2013).

3. For historical perspectives of interconnectedness in environmental philosophy see Nash (1989).

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Case Study: Kaospilots—From Passive Listeners to Global Change Agents

Jenna Lähdemäki

INTRODUCTION

Designing Your Life is one of the most popular courses at Stanford University (Kurutz 2016). It applies design thinking to life's big questions like 'what am I going to be when I grow up?' The course gives students tools to understand their own motives and aspirations. For many people, it would appear or seem not very good at answering the question of what would be a fulfilling career and life path for them. To that end, many make life decisions based on their own expectations towards themselves ('I have to become successful and successful to me means becoming a lawyer') or based on someone else's expectations (e.g. 'my mother has always hoped I become a dentist') (Fig. 12.1).

Kaospilot answers partly the same question as *Designing Your Life* does. There are too many university students who have struggled their way to the major they think is the answer to their dream career path, and then feel disappointed for reasons they might not know how to explain. This usually has to do with the lack of focus in personal

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Fig. 12.1 Kaospilot mailbox at the school building in Aarhus, Denmark

development and self-reflection, both from an individual perspective and in terms of the teaching given from educational institutions. Students don't know how to articulate what they have learned, or their area of expertise and their strengths.

Furthermore, the job market is becoming increasingly insecure and entry-level positions are relatively rare. Many recently graduated people have difficulties finding a job that can both pay the rent and give them the requisite meaning and challenges. The Economist article 'Young, Gifted and Held Back' (2016) describes the consequences:

For the first time in history, the world's youngsters form a common culture, so they also share the same youthful grievances. Around the world, young people gripe that it is too hard to find a job and a place to live, and that the path to adulthood has grown longer and more complicated. Today's under-30s will one day dominate the labour force. If their skills are not developed, they will be less productive than they could be. (para. 3)

One part of this puzzle is the question of how higher education prepares young adults to face an uncertain job market and ever more complex societies. There is a clear need for alternative education programs that give students the tools, networks and experience, and then empower individuals, grow their self-confidence and their faith in the future. Having theoretical knowledge is simply not enough.

Alongside Kaospilot, there are many other successful alternative education courses where an underlying theme is nurturing of capacities and competencies that allow a person to create their own job with an installed ‘meaning’. One notable course is the 10-week *Global Solutions Program*¹ offered by Singularity University, where participants from about 45 countries study the world’s biggest challenges, like poverty and climate change, and create solutions to battle these challenges with the help of exponential technologies, like AI and robotics.

Singularity University was founded by research scientists Ray Kurzweil and Peter Diamandis and is located in the NASA Research Park in California’s Silicon Valley. The summer course has given birth to numerous interesting companies like Iris AI, involved with the ground-breaking use of scientific knowledge, and companies focusing on the development of resuscitation technology such as Neurescue used in cases of cardiac arrest.

For this case study, we will focus on Kaospilot, an entrepreneurship and design school located in Aarhus, Denmark.

The Finnish Innovation Fund, Sitra, has been working with the vision of creating a sustainable well-being society. Sustainable well-being refers to the pursuit of a ‘good life’ within the earth’s carrying capacity. This means that well-being is addressed in a holistic way and that humanity is consequently adjusting to the planetary boundaries. The other principles of a sustainable well-being society are in the empowering of individuals and communities, moving to a regenerative and collaborative economy, building competencies for a complex world, and developing inclusive and adaptive governance. When I visited Kaospilot in Aarhus, I was interested in terms of both ‘if’ and ‘how’ the Kaospilot education could take these myriad themes into account. For this is a school that teaches students to say, ‘I can change the world’.

WHAT IS KAOSPILOT?

The world is not short of challenges, or opportunities. What we need are people who can create new solutions and act with empathy within complex and turbulent situations. (Excerpt from Kaospilot mission statement)

Kaospilot is a hybrid business and design school with a strong emphasis on entrepreneurship. The Kaospilot programme is centred on teaching ‘change makers’ the ability to both navigate their way through uncertainty and to use it to their advantage, and to also embrace the opportunities presented by uncertainty and complexity. There is one other Kaospilot school in Bern, Switzerland that has a similar program and curriculum to the Aarhus school, though both schools have local adaptations.

Kaospilot was founded in 1991 by Uffe Elbaek, Thomas Heide and Gitte Madsen. Elbaek left the school in 2006 to serve as the Danish Minister of Culture from 2011 to 2012. Elbaek can variously be described as an author, entrepreneur, politician and political leader. Currently, he is a Member of the Danish Parliament for the Alternative party. He is the founder and leader of Alternative—a party that states it is against economic growth as the only economic path and instead works towards ‘sustainable transition, a new political culture and the entrepreneurial creative power of society and individuals’ (What is the Alternative 2017). Following the departure of Elbaek, Christer Windelow-Lidzelius, a former Kaospilot graduate, became the principal of the school in 2006.

Education at Kaospilot is rooted in action rather than theory. Students are evaluated on the basis of four criteria, which also serve as the objectives of education: to create deep meaning with others, improve themselves as change makers, develop and foster their personalities, and co-operate with their local community. Kaospilot is single-minded in its pursuit: to be the best school *for* the world, with a focus on social change, creative entrepreneurship and personal growth.

The school’s three-year program, combining leadership, business design and project and process design, is equivalent to a bachelor’s degree in scope, but in other respects, is very different from traditional studies at higher education institutions. Kaospilot is a private education institution that is partly financed by the state. This means that there is no accreditation for the Kaospilot diploma. Many universities still consider it a bachelor’s degree when students apply to master’s degree programs. Admission requirements to Kaospilot consist of written application and an in-person workshop.

The studies comprise working on projects with clients and a four-month study period abroad, during which the students work on a change target chosen together with the local community. The final year of studies is fully focused on the individual student’s own business idea and personal project.

‘The premise here at Kaospilot is not really to help us find career employment, but rather that we create our own jobs and perhaps employ a few others in the process’ (Anu Paajanen, personal communication, October 2015) says Anu Paajanen, who was the only Finnish student at the school at the time of this writing.

Students are required to pay a fee to study at Kaospilot and only 38 students are admitted each year. Nevertheless, according to the Head of International Development and Education Design, Simon Kavanagh, compared to an average higher education institution, the school has fewer teachers in relation to the number of students. For Kavanagh, this proves that traditional education institutions can and should focus their energy on improving the student–faculty relationships so that students do not feel neglected. That said, the main responsibility with regards to learning and development always rests on the shoulders of the students. Kavanagh stresses:

It all starts with creating a close-knit community in which the students are responsible for their own learning, while knowing that assistance is available, provided by the team leaders and other staff, whenever necessary. We care about every one of our students. (Simon Kavanagh, personal communication, October 2015)

Alumnus David Jul adds:

Most of the educational institutions give you a diploma on the last day of your studies and then you are a graduate and can call yourself an engineer, for example. At Kaospilot, you are seen as a professional from day one and you also work with the clients starting the very first autumn of studies. It gives you a sense of belonging and ownership. (David Jul, personal communication, October 2015)

KAOSPILOT—THE BASICS

- Kaospilot was founded in 1991 by Uffe Elbaek and partners.
- 38 new students start Kaospilot studies every autumn.
- There are around 110 students studying each year in total.
- Average age of a Kaospilot student beginning studies is 24. You can apply only after turning 21-years old.
- Kaospilot is a private school and the cost of the 3-year education is EUR 20,000.

- 50% of the students come from Denmark, 25% from other Scandinavian countries and 25% from other countries.
- Around one third of the schools funding comes from the Danish Ministry of Science, one third comes from the student's tuition payments and the final third is financed by Kaospilot's consultancy's profits.
- According to an alumni study made by Kaospilot, 97% of Kaospilot's graduates are employed two years after graduation. According to Eurostat, the overall employment rate for higher education was 83.7% in 2014 (Eurostat 2014). The OECD average employment rate for working age population (15–64 years) is 67%. In Denmark, the figure is 75% (OECD).

THE STORY—WHY WAS THERE A NEED FOR A KAOSPILOT EDUCATION?

A project that was totally devoid of realism. (Windeløv-Lidzélius 2012)

In 1989, two years before the Soviet Union collapsed, the founder of Kaospilot, Uffe Elbaek, and his colleagues from the Frontrunners (Kaospilots' predecessor) wanted to do something radical. They decided to organise a rock concert in Moscow's famous Red Square. Elbaek and colleagues wanted to foster solidarity, peace and a sense of belonging between Danish and Russian youngsters. The project was called *The Next Stop Soviet*. The Danish group wished to show that world politics and relationships between individuals were two separate issues, and that young people were similar on both sides of the iron curtain.

However, the Next Stop Soviet project team were not able to organise the rock concert in the middle of the Red Square as planned and had to settle for a more remote and consequently less high-profile spot on the periphery of Red Square. Despite the small setback, the concert was organised and the team received a cheerful welcome home when they returned to Denmark. They had done something extraordinary, something that had caught the public attention. Kavanagh explains, 'This also had to do with bigger trends at the time: hierarchies between adults and younger people were slowly fading away. Now young people were seen as active agents at the societal level' (Simon Kavanagh, personal communication, October 2015).

Even though the rock concert in Moscow was seen as a spectacular success, financially the organising group were left with debts of 150,000 Danish Krone (approx. EUR 20,000/USD 23,000). As a result, the group started working with similar kinds of community projects in Denmark in order to pay back the debt. These different projects garnered notable visibility and finally caught the attention of the then left-ist government. Politicians in power thought, in short, that the group's work was valuable and should be supported.

Together with the government backed support and other converging events, in 1991, Kaospilot was established. Incentives that led to the founding of the school included the ideas that in 1991 the founders (Uffe Elbaek, Thomas Heide and Gitte Madsen) saw that the world was moving towards a project-run society and that people needed new skills, competencies and mind-sets in order to flourish in this new global order. Other incentives for starting Kaospilot included much discussed analyses of what could have been done better in Moscow in 1989, and what kind of education could have supported this group in their ambitious project. The group also pondered and analysed how they could have been better negotiators with the KGB and how, ultimately, they could teach these skills to other students.

The rock concert organised in Moscow represented, in hindsight, the start of Kaospilot. The organising team faced considerable obstacles with the local authorities as well as numerous other organisational challenges. Areas of discussion turned to the fact that that there was no school or education program that would prepare you for an experience like organising a rock concert in Moscow during the Soviet Union era or taught you skills like negotiating in difficult situations or organising an event in unusual contexts. These were some of the guiding ideas at the time of Kaospilot's founding.

The school has been built to embrace change and to facilitate the finding of skills needed to act successfully in an always evolving environment. The school also has a strong societal focus. One bold slogan proclaims, 'we want to be the best school for the world'. Simon Kavanagh explains the premises and targets of Kaospilot thusly, 'I mean changing the whole game, not just parts of it. Holistic and systemic solutions are core to everything. Systemic means to me that the system is made self-aware of the challenges it is dealing with' (Simon Kavanagh, personal communication, October 2015).

There must have been some kind of signal with respect to the decline of the Soviet Union when Uffe Elbaek and compatriots were organising the rock concert two years before the December 1991 dissolution. The group, however, did not see this geopolitical earthquake coming and Kavanagh says that training Kaospilot students to recognise weak signals both in society and in the markets is an important part of the education. This is called *Listening Louder* in Kaospilot language. According to Kavanagh, ‘It is important to analyse what is the arising need that the weak signal describes. With the right competencies, recognising weak signals can be catalysed into action’ (2015).

Kaospilot grounds its business thinking in the widely used 3P Model (People, Profit, Planet) originated by John Elkington in 1994.² According to Kavanagh:

We are a social entrepreneurial school, but we don’t force students to be social entrepreneurs. Ironically, being sustainable and responsible also improves your businesses bottom line. So even if a student comes to the school with a corporate business mind, they might notice that purpose-driven business creates more money. (2015)

At the time of this writing, the school is hosting its 23rd class of Kaospilot students. Each year, a new team of 38 students begin their learning journey. While visiting the school, it became evident that the students had a remarkably strong team spirit. It seemed that the students also identified themselves strongly with their designated teams. ‘I am from team 22’ was, for example, an expression heard several times during the visit.

Naturally, the school has both changed and evolved across the years. Nevertheless, some fundamentals have remained stable. Founder Uffe Elbaek attested to this continuity, ‘although the curriculum has changed radically today—luckily—from when the school was founded over 20 years ago, in my eyes some things have not changed; not least the special professional and cultural mind-set that is unique to Kaospilots’ (Windeløv-Lidzélius 2012). Alumnus David Jul agrees:

The way the community is built is one of the fundamentals. It is part of the tradition that we nurture our community and take responsibility for it. (David Jul, personal communication, October 2015)

AN ALTERNATIVE FOR ACADEMIA—EDUCATING CHANGE AGENTS

Kaospilot has ambitious achievement targets and during the visit, the interviewees were asked what being a change maker meant to them. There were some similarities that were present in most of the answers. These oft-repeated statements included building of self-knowledge, having a vision of the kind of change you want to see take place, the ability to start working even if you cannot envision the full picture of the project in hand, and finally, having a strong trust in one's ability to act successfully towards a grand overarching goal.

During the visit, Kaospilot alumnus Jul reiterated that it is more important for the school to keep trying to figure out what being a change agent is about, than in actually finding the answer. The following quote from Kaospilot principal Christer Windeløv-Lidzélius describes the teaching philosophy of the school and also reveals what is expected from students and what kind of qualities are considered important in order for the students to build their career as a change agent:

Our fundamental understanding of how we teach people is to help them to teach themselves. There are certain things you can teach, but only so much. What we do essentially is to curate the learning journey for each person individually. The belief is that our students are already creative. They bring their talents and their ideas with them. Besides, we strongly believe the people who come to our school are self-motivated and self-driven, and that they need to be that, in order to pursue their goals and their values. In order to be a successful and productive Kaospilot student, you have to be your own teacher. Our students who enroll at this program are not empty vessels in which we pour certain things and thoughts in their heads. (Kerstin 2015)

First-year student Paajanen stresses here the importance of having the skill to get other people engaged and motivated when working towards a change. It is important to have a strong vision, but in addition '...there is the action part. You need to actually get people working towards that change' (Anu Paajanen, personal communication, October 2015).

Pete Sims, team leader and curriculum designer at Kaospilot, in pondering the question of change agency, points out two components and notes that having a vision of change does not grow in a vacuum:

One, is to have personal agency and two, is to connect to something bigger than yourself. Sometimes the trap is that people think that ‘I have to first focus on myself’, ‘find myself’, and ‘then I can go and change the world’. If you have something you need to work on, some issue, then that makes sense, but I don’t think you become yourself until you get beyond yourself. Doing something that is bigger than yourself is the key. (Pete Sims, personal communication, October 2015)

Kis Jakobsen, Head of Studies, adds that an ‘enterprising leader’ knows their place in the community they are living and working in. Likewise, they also have language, networks, meaning and direction, in addition to the necessary skills and competencies.

So, what then are these skills and competencies? David Jul proposes that it is necessary to have knowledge about how the system or organisation you are trying to change actually works. Jul further emphasises that learning from the past is important in the sense that sometimes, in the midst of the innovation hype, we forget to look back and learn from what has already been done.

From the author’s perspective, this all sounds quite demanding. Are Kaospilot students somehow untouched by the anxiety that uncertainty causes people? The answer must be ‘of course not’, but Jul considers that maybe they are a little bit better with coping with and even embracing uncertainty. To that end, the Kaospilot program has been built so that it causes anxiety in terms of approaching and analysing the big philosophical questions in life.

Kis Jakobsen adds his weight to this argument and explains that often during the third year of their studies, when a sizeable portion of the year goes into students’ final projects, students enter a phase when they start asking themselves existential questions and questioning their choices:

We even congratulate the students for that because we see it as a very natural phenomenon and it also means that they are going through a personal growth period that many people end up facing only in their forties or even later in life. These students ponder the big questions at an early stage of their life: what do I actually want to do with my life and how do I want to spend this life I have? (Kis Jakobsen, personal communication, October 2015)

Raising the ambition-level and capacity of students is considered to be an important part of the Kaospilot pedagogy. Simon Kavanagh says that as an educator you have to be clear about the level where the students are, and where they want to go, and where you, as an educator and want them to develop. ‘You have to be demanding enough’ (Simon Kavanagh, personal communication, October 2015, he emphasises). The founder of the school, Uffe Elbaek, talked about the same issue at an event in Helsinki in May 2016, ‘You have to be demanding enough so that the students reach their potential, but there is a fine line in making the students break down with over-pressure.’

HOW CAN WE START EDUCATING CHANGE AGENTS EARLIER?

When asked about the creation of Kaospilot’s close-knit community, Kavanagh says, ‘It’s about creating a learning space that is intimate and personal. You need to have a stake in your teammates and in the community. Creating an intense, rigorous training space is difficult to do at scale, it needs to be done based on the needs of a specific group’ (2015).

This close-knit community is not something you can create in a day, as it requires the constant development and commitment of the people involved in it. Students spend a lot of time with their own team. The team consists of students that start their studies together. Building a close-knit community and a sense of belonging is one of the fundamentals at Kaospilot. It is a good grounding for creativity and for the courage to experiment. In the first days of their studies, the new Kaospilot students go out to the countryside and spend a couple of days there at a culture boot camp, where the cornerstones for the three-year co-operation program are laid down.

‘Each year’s class has, in a way, their own microcosm,’ states first-year student Anu Paajanen. ‘My class has a very empathic culture, whereas the class that started the year before has a culture of questioning everything’. At the beginning of our studies, the team leaders said to us that it is ‘your class’s culture’ so it is your responsibility to develop in the direction you want to (Anu Paajanen, personal communication, October 2015). She continues:

The school has Wednesdays off, so each year’s class can do what they want on this particular day. We decided to have them as team days where we concentrate on developing our team work. We created a team culture

council, because we noticed that we had been discussing our values quite a lot, but they were not being emphasised much in everyday life. We wanted to do something about it, and now the class members can suggest different kinds of activities to the council. This approach is also simultaneously about practicing how you create and lead an organisational culture. (2015)

While interviewing various individuals at Kaospilot, questions arose about how we could, as a society, start educating or empowering societal change agents earlier than when students enter higher education. The interviewees, upon reflection, agreed that if a student has learned for 10–12 years that being a good student means being a well-behaving listener who makes no mistakes, then the educational system has ‘failed’. Not least, there is a lot of work to be done before these students trust that there are not necessarily any right answers, and the best outcomes might come by first randomly bouncing around thoughts and ideas within a team. So, in that sense, there might first be work to do in convincing students that their own ideas and thoughts are valuable and can have a beneficial impact on others.

What could be done differently in an elementary school? According to the interviewees, having a very holistic view of education is important. It is not only about learning different skills and learning to use different tools, but about training your mind-set, being empowered to take action and not only analyse different phenomena. Also, a strong focus on personal growth and building self-knowledge is essential. Adding meditation and concentrating on personal growth is still something quite rare in traditional school systems.

Creating a well-functioning culture of critique (or feedback) is one of the essential prerequisites at Kaospilot. Student Paajanen believes that working on giving feedback in a classroom or in any other type of team or organisation is very beneficial. The attitude in Kaospilot is that feedback is a gift and the only way to learn how your decisions affect others. With a functioning feedback culture, students can grow their self-knowledge and teamwork skills. One tool to help create constructive feedback mechanisms is the Johari Window model that helps students analyse the blind spots in their communication style. The Johari Window is a two by two matrix with questions created by two psychologists, Joseph Luft and Harrington Ingham, in 1955.

One frequently used technique at Kaospilot is the daily check-in and check-out practices where students gather in a circle and reflect on their

expectations, hopes and concerns. This same technique is used in project work that students do as part of their studies. The most crucial part for the project to succeed, however, is considered to be the very beginning, how it is initiated. To that end, the students might even do a pre-project where they create a basis for the team dynamics and concentrate on the goals and objectives of the project at hand. There is an undeniable logic to this: before the actual work begins, the students want to understand each team member's strengths, weaknesses and style of working. At this point, the team puts effort into understanding both the different professional profiles present in the team and the different communication styles. Paaanen argues that this way it is easier to understand why people act the way they do, and it is easier to solve conflicts, or indeed even prevent them. After a year of studying at Kaospilot, she says that she has more understanding of how differently people work and how she herself co-operates with her colleagues and how her way of working impacts others.

During a project, some teams might schedule one day a week to tasks that involve evaluation and feedback. A critic might argue at this point that it would seem that all the time at Kaospilot passes on mere reflection while no actual work is done. Paaanen disagrees with this critique and says that the time is used very effectively, and a lot is done when the team shares a direction and has communal feeling of a common mission. It has been noted by numerous experts that there are numerous wasted learning possibilities, both professional and personal, when people rush into their next assignment or project without reflecting on what went well and what should have been done better regarding the recently completed tasks. 'How, for example, did the team deal with mistakes or challenges? And what did the team do well in the planning phase and was the chosen strategy optimal? Evaluating these questions, together with the team, is a very educational experience,' says Kavanagh (Simon Kavanagh, personal communication, October 2015).

One Kaospilot student explained that an important part of the education was learning different practical techniques and developing a mindset. Examples of this include how the students facilitate a brainstorming session, start finding solutions to complex challenges, managing creative processes, learning ways to get other people engaged, analysing trends and tapping what they are doing into the bigger picture of what is going on in the world. It could be argued that these are things that you could be taught at any primary or secondary school. It is about learning to take

responsibility for your education and learning that you can be influential. Similar kinds of learning philosophies can be applied to different age groups, from primary school children to retired people.

KAOSPILOT'S WAYS OF WORKING

Described below are a list of different practices that showcase the Kaospilot way of operating. An organisational culture is always unique and dependent on the individuals and their dynamics and the atmosphere they create as well as different structures—both formal and informal and visible and invisible. By looking at different daily practices, we can understand aspects that contribute to the unique organisational culture of Kaospilot.

Finding Mentors and Establishing a Sparring Network

The students are encouraged to find mentors to support their professional growth. Students also work together with team leaders or other staff members at Kaospilot. They can ask for sparring with anyone from the organisation if they believe that that individual would have valuable insights related to their project. The staff then could be considered as a network of sparring partners for the students.

No Tests

There are no traditional tests where you simply write down what you have read, but following longer projects, students give presentations and produce reports for their team leaders and colleagues. Even though the project might have 'failed', the students responsible for the project can still receive a high grade, if they succeed in analysing and documenting why they believe the project 'failed' and what they learned from it. Self-reflection and personal growth is once again an underlying theme that supports the substance experience that students gain. Presentation skills are essential in order for students to get their message heard and understood and students need to have explicit possibilities to train their presentation skills.

Anu Paajanen explains that students receive certain reading lists and some concepts are expected to be understood. This can be done by reading a book, watching a video and listening to podcasts or audiobooks.

The format is irrelevant as long as the students gain a beneficial understanding of the material.

Team Leaders and Outside Lecturers

All three classes have their own team leaders. ‘The role of the team leader is many fold. Their tasks involve guiding, coaching, planning the curriculum and being really out there for the students. There is no position like this in the university world,’ states Kavanagh (Liam Kavanagh, personal communication, October 2015).

The great majority of the lectures and workshops are held by outside experts. During its 25-year history, Kaospilot has created a global network of experts and lecturers. Bringing various voices and experts to the school is one way to keep the intellectual foundations of the school in constant development.

The Physical Space and Learning Environment

The building Kaospilot occupies is more like an office building than a traditional school building. The staff and students call it the ‘home base’. Each year’s class has their own space that they manage (Figs. 12.2, 12.3 and 12.4).

Alumnus David Jul says that what is important to notice at Kaospilot is that the students are part of a professional network from day one of their studies. They do projects for clients and learn how to deal with people from different backgrounds, positions and sectors. It is a different kind of approach to academia, where on their last day they receive a diploma that states that they have graduated and can now be seen as a professional.

When I visited Kaospilot in October 2015, the first-year students were working on their first project. It was assigned from Doctors Without Borders and the assignment was to find ways to increase the number of volunteers by approximately 6000 people. This was a follow-up project from the three-day entrance exam, where the applicants also worked in teams with an assigned project. Doctors Without Borders had chosen the most appealing results for a follow-up development phase.

The first project that the students face is a follow-up project from the entrance exam. They are not given any guidance on project management or substance issues related to the project. The students, simply, are expected to figure out essentially everything on their own.



Fig. 12.2 Inside Kaospilot

The only thing that prepares them for the project, given to them by the school itself, is some basic information related to design thinking. The rationale behind this deep-dive is that upon completion of the project, when project management tools, feedback mechanisms etc. are taught, the students have experiences to reflect upon. According to Kavanagh, this ‘thrown-in-the-deep-end’ type of situation creates considerable frustration for the students, but also serves as a tremendous learning experience.

Outpost

In the fourth term, i.e. spring of the second year of their tenure, Kaospilot students embark on what they call an ‘outpost’. It is a four-month study period abroad, during which the student works on a change target, chosen together with the local community. The goal for the outpost is to apply what the students have learned, into a different cultural



Fig. 12.3 Inside Kaospilot

context, to create an organisation from scratch and to co-ordinate around 10 projects under the organisation they have started. An important reason why the outpost is both conceived and implemented is to give the students an experience of what it is like to work in a context that is out of their comfort zone.

Previous Kaospilot outposts have been organised in Bogota, Durban, Vancouver and Cape Town, for example. The final year of studies is fully focused on the individual student's own business idea and personal project.

TO WHAT IS KAOSPILOT AN ANSWER?

To what is Kaospilot an answer? What has been missing from, or has otherwise gone wrong in mainstream, traditional higher education? At Kaospilot, there is a slogan that says, 'Learning, not performing.' This slogan quite nicely sums up the issues and challenges in mainstream



Fig. 12.4 Inside Kaospilot

higher education institutions: the focus on external motivational aspects like performing well in tests or meeting accreditation criteria. Anu Paajanen argues that a key point in Kaospilot's philosophy is clear that failing, as well as not knowing or understanding, are both allowed and even encouraged. These are considered the keys to developing the student's thinking. Some Kaospilot students have dyslexia (characterised as trouble with reading, despite normal intelligence) and across their entire school career felt that they were 'stupid'. At Kaospilot, the teaching methods are versatile and there is no 'right' learning method.

Taking into consideration the fact that Kaospilot has a small number of students and relatively high tuition fees, Kis Jakobsen states that Kaospilot is aiming to educate high-potential individuals. From Kaospilots' perspective, the understanding of who is a high-potential individual might just not be the traditional one, not least because of the lack of academic and test-based achievement.

The Kaospilot curriculum has been built on four competences: subject competence, relationship competence, change competence and action competence. At the heart of these cornerstones of the curriculum are the creation of value for self and others. The Kaospilot curriculum defines the school's values to be those of courage, curiosity, empathy, lightness, patience, humility, generosity and toughness.

Prior to her studies at Kaospilot, Paajanen studied social sciences at The University of Helsinki. She started to ponder her future path in life after graduation and felt it was difficult for her to specify what she had to offer for an employer, even though she could provide both work and academic experience. After studying for a year at Kaospilot, her feeling could not be more different. 'I was ready to consult organisations after the first month at Kaospilot,' she says with a smile. 'Through different client projects you gain practical experience, self-confidence and networks. When you graduate, you know what you can do and what your strengths are. Part of the reason is that during the studies we concentrate on asking why-questions and analysing meaning and values. This is not present in many higher education institutions,' Paajanen observes (Anu Paajanen, personal communication, October 2015).

CONCLUSION

Returning to Sitra's sustainable well-being framework and considering the themes of adjusting to planetary boundaries, climate change and limited natural resources, the author has a sense that if one is concentrating on ecological sustainability, it is worthy, but is not the only focus of the work of change agents.

The primary aspect of holistic well-being in Kaospilot's educational system is to provide the tools and frameworks for the student so that they can create a mind-set that allows them to act in complex situations and strengthen their competencies, both as an individual and as an entrepreneur. Furthermore, students are supported in finding a career path where they can do meaningful work that is personal, but also beneficial for the rest of society and the planet in its entirety.

Often, traditional university programs are criticised for focusing only on subject matters and having a narrow scope when it comes to working with the complex ways in which people learn (not focusing enough on teaching students how to communicate or apply what they have learned).

Students can too easily get ‘drowned’ in information and the only valid indication of success is how well you score in tests and exams. Kaospilot has gone in the other direction and focuses on how things get done, i.e. how you start, facilitate and manage a change process and how you create effectiveness in practice. Having a more holistic understanding of learning where meta-learning, skills, character and knowledge are combined, can be said to be aim of a Kaospilot education.

Kaospilot has, with its own operations, modelled how to move from the culture of working alone in subject silos, to a culture where it is understood that change happens through collaboration, co-creation and sharing. Start-up hype has created incubator and entrepreneurship communities in universities around the world. As a result, the understanding and excitement of co-creation, experimental culture and design thinking has spread. This is one of the reasons why Kaospilot is not as alternative or ‘radical’ now as when it started in 1991. And this is positive. The interviewees for this case study acknowledged this and some of them were even pondering what could be the next level in terms of how Kaospilot could even more effectively challenge some of the recognised contemporary norms in educational institutions, and in society.

Kaospilot as an organisation has modelled the kind of skills, character and knowledge that is needed to succeed in the complex times we live in. One example of this is the changing role of a teacher from a lecturer to a co-learner, guide and facilitator of learning. This has been the mode of teaching in Kaospilot and is now strongly present, for example, in the new Finnish national core curriculum, an educational template that has received international recognition.

Those who founded and are currently operating Kaospilot have well anticipated and practiced the kinds of skills needed for our complex times of economic, political and societal uncertainty. We need this courage to help create a better world—and we need a world where this courage can be practiced and developed.

NOTES

1. <https://su.org/programs/global-solutions-program/>.
2. <https://www.economist.com/node/14301663>.

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Case Study: The Finnish National Curriculum 2016—A Co-created National Education Policy

Jenna Lähdemäki

Welcome back to school. During the summer a revolution happened. This autumn the new national curriculum will become effective in Finnish schools. First at K-12 education and then at secondary school. Every school interprets the curriculum in their own way. The basis of the curriculum is national, municipalities do their own alignments and schools decide on the details. (Aalto 2016, translated by author)

Following the publication of an article in Helsingin Sanomat on August 6, 2016, many Finnish teachers reacted to the news piece saying that a ‘revolution’ was too big a word to accurately describe the effects of the new national curriculum. That said, Finnish schools undeniably faced something new starting in the autumn of 2016. Janne Hirvonen, a school principal from Rautjärvi, in Eastern Finland, described the curriculum thus, ‘This is an enormous change. Our aim (at Rautjärvi school) is that the everyday life of our school will change so that it reflects the new curriculum’ (Janne Hirvonen, personal communication, May 2016).

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THE NATIONAL CURRICULUM OF FINLAND

Finland's national curriculum guides the nation's whole education system. It sets the framework for school work by defining the values and objectives for all Finnish schools. There are no school inspections or national achievement tests covering entire age groups (though there are sample-based national achievement tests for two or three of the basic education subjects every year). This is why it is perceived to be important to have a shared framework. The curriculum defines the main objectives for different subjects and inspires the use of new kinds of learning methods (and later in this chapter you can read more about project-based learning and its aim of achieving a more collaborative learning). Despite the common framework offered, there remains considerable freedom for individual schools to interpret the curriculum as they wish. The 500-page document consists of values, objectives and general principles that number around 100 pages. The rest of the document covers the subject syllabi.

The origins of the national curriculum date from 1970 when the national curriculum committees report was released. The curriculum is now managed by the Finnish National Agency for Education (EDUFI) which leads the curriculum development work every ten years.¹ The first curriculum, led by the EDUFI, was created in 1985 after which it was renewed in 1994 and 2004, with the latest work started in 2012. Over the course of the latest development cycle, the curriculum evolved from a fairly typical bureaucratic process to a leading example of co-created public policy. Hundreds of professionals participated in the 2.5-year long curriculum design process. The national core curriculum was completed at the end of 2014, with the local curriculums ready in 2016. The new curriculum became effective in August 2016.

This case study aims to study and analyse what appears to be a successful co-created educational policy—the *Finnish National Curriculum 2016*. The author wished to understand the factors behind the success of the curriculum process, how ownership was created during the process and what school principals and other education professionals think about the curriculum content, as well as the processes and methodology. Questions abound. What are its strengths and weaknesses and does the curriculum pull schools closer towards their purpose? The Finnish education system has been celebrated as a twenty-first century global success story—what role does a national curriculum play in this story and how does it take the education system closer to enabling sustainable

well-being? Does the progressive value-base and content of the curriculum successfully transfer to the classroom?

A CO-CREATED NATIONAL POLICY

What became clear during the research for this case study is that the Finnish national core curriculum is more about the complex process of creation than it is about the actual final product. Decade after decade, the curriculum process has developed into a more open and inclusive process. The now retired lead of the curriculum process, Irmeli Halinen, has described the national core curriculum and the local curriculums (based on the national curriculum) as having been created through open, interactive and co-operative processes. The curriculum work is seen as an ongoing dialogue and learning cycle that helps professionals in the education field identify the issues to be improved and promote the commitment of all stakeholders in the curriculum process. The curriculum also sets the agenda for education at a societal level; its core purpose, objectives and principles.

Arja-Sisko Holappa, the Counsellor of Education from EDUFI, is of the opinion that even though the groundwork is done by the Agency, it is understood that the best ideas to develop education generally do not come from the administration. This understanding explains why it is crucial to see the curriculum reform as a national learning process for the whole community of educators and other professionals in the field. The curriculum is based on legislation, and the local curriculums are binding for teachers. But when professionals are part of the process of designing the curriculum, there is no need to use coercive power. The Basic Education Act and Decree in Law sets the base for curriculum work. The Finnish parliament is responsible for defining the general national objectives and distribution of lesson hours for basic education (Arja-Sisko Holappa, personal communication, May 23, 2016).

The experts interviewed for this case study commented that the curriculum reform allows professionals from the field of education to take time and reflect on the big questions facing education. For example: what is the curriculum's purpose? What is the role of a student, a teacher and society in terms of learning? What should the future look like and what is the role of professionals in the system?

Even though the curriculum is binding, there are no sanctions or other forms of punishment if schools or teachers do not adhere to it. To that end, the level of interest and commitment to bring the objectives of the curriculum to the classroom itself vary across different parts of Finland, as well as between different teachers working in the same school (Table 13.1).

Irmeli Halinen, who was the Head of Curriculum Development, describes the curriculum development as a ‘whole of society’ project with comments contributed by many stakeholders across Finnish society. Occasionally, some of the approaches proved surprising, like the Finnish police who wanted to give their support by writing chapters about safety and security. Three official commenting phases were open for anyone to comment. At the same time, EDUFI asked education authorities and schools to comment on the document through a survey planned for the precise purpose. Schools were also encouraged to include parents and students’ feedback.

The goal of EDUFI was to make all of the stakeholders ‘experts’ of the curriculum. During the process, it was noticed that a curriculum roadmap was needed so that it would be easier for municipal education authorities, principals, teachers and other education specialists to participate in the project which ultimately spanned across more than two years. One of the most important stakeholder groups were the municipal education managers who were responsible for writing the local curriculums. Local curriculums are based on the guidelines of the national curriculum, but acknowledge the local features, geographic-related influences and other specific needs of the regional demographics.

Table 13.1 Curriculum process

-
- 2.5-year process
 - Final document is nearly 500-pages long
 - Three official commenting phases on the public document through the Finnish National Agency for Education website
 - More than 4000 comments received from individuals, groups and over 180 different organisations or communities
 - 30 working groups and steering groups took part in the work
 - Each municipality in Finland (amount of municipalities in Finland starting from 2017 is 311) had their own curriculum working groups
-

The author asked Arja-Sisko Holappa about the purpose of a curriculum. She did not have to think about the answer for long:

They exist to secure equal education for the whole of Finland. The curriculum is a way to guide the whole system and a tool for securing equality and providing professional development for teachers. But what has to be acknowledged is that there is the official, written curriculum, and then there is the lived one and the hidden one that influence cultural norms. (Arja-Sisko Holappa, personal communication, May 23, 2016)

In Sweden by comparison, the latest national curriculum dates back to 2011 at the time of this writing. The curriculum carries a strong emphasis of creating more equal schools across the country. Sweden has had challenges with respect to the pupils learning outcomes in general, and the latest curriculum is aimed at strengthening the steering of the schools at a national level.

THE 2016 FINNISH NATIONAL CURRICULUM—WHAT MAKES IT SPECIAL?

The new national curriculum of Finland is a progressive document. This can be seen in the value base set for Finnish education, how ‘wellbeing’ is defined in a holistic sense and how research has been utilised in the process of creating the curriculum. In practice, these are reflected in how transversal competences are being implemented in schools and how assessment practices are changing to support every child’s individual strengths.

The 2016 curriculum work started with the understanding that the impact of globalisation and the need for a sustainable future were reshaping the fundamentals of schooling. It was also understood that the skills and competences needed to succeed in society and working life were also dramatically changing and thus education, pedagogy and the role of the school itself needed to change in relation to these ongoing global shifts. In an article by EDUFI entitled ‘Making Sense of Complexity of World Today: why Finland is Introducing Multiliteracy in Teaching and Learning,’ the need to address these shifts within the curriculum was explained:

The increased need for transversal competences arises from changes in the surrounding world. In order to meet the challenges of the future, there will be much focus on transversal (cross-curricular) competences and work across school subjects. As structures and challenges of doing, knowing and being are changing essentially in our society, it requires us to have comprehensive knowledge and ability. Competences include a vision of the desirable future and the development of both society and education. (Halinen, Harmanen, & Mattila 2015, p. 139)

The national curriculum that was implemented in Finland in 2004 needed to be updated. The reasons for this are many, varied and include the following: subjects were too unattached, objectives for education and learning needed clarification, learning environments and methods had changed, student's well-being needed more attention, more diverse assessment methods were needed, the collaboration between school and homes had changed, and finally, the national curriculum of 2004 no longer supported the future challenges of schools and learning to the standards and levels required.

Irmeli Halinen suggested that the key questions to support the curriculum work were: what will education 'mean' in the future? Furthermore, what kind of competences will be needed and what kind of practices would best produce the desired results in terms of both teaching and learning?

According to Halinen, the new national curriculum was built upon the core strengths of the Finnish education system, strengths that include a culture of co-operation and trust, as well as competent, committed and autonomous teachers, and an already well-functioning curriculum process. The starting point, from the view of the schools themselves, was to strengthen the pupils' sense of coherence and to support them to take responsibility for their actions and choices that shape their (and therefore our) future (Fig. 13.1).

The defined values for the Finnish national curriculum are:

- Uniqueness of every pupil and high-quality education as a basic right
- Necessity for a sustainable way of living
- Humanity, culture and civilisation, equity and democracy
- Cultural variety as richness

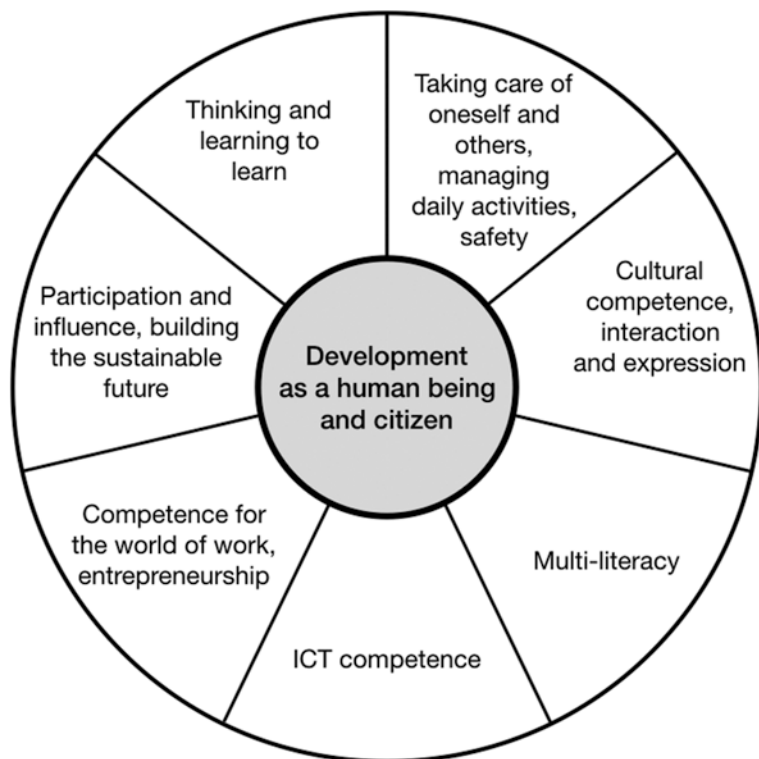


Fig. 13.1 Transversal competencies in the Finnish national curriculum

The focus of the curriculum reform has been broken down into three key themes:

- Rethinking learning: learning to learn in dialogue with others, importance of feelings, experiences and ideas and their joy of learning
- Rethinking the school culture and the relationship between the school and the community
- Rethinking the roles, goals and content of school subjects: moving towards transversal competences to support the identity development of a child and the ability to live in a sustainable way.

To summarise, the key challenges and changes arising from the curriculum from the school's perspective are:

- Developing school cultures to support curriculum values and goals and developing schools as real learning communities
- Students' role is more active and inclusive
- Teachers' role changes; reduced lecturing from a podium
- Technology and digitalisation; e-books, coding and digital learning platforms more strongly implemented into schools' eco-system
- Project-based and multidisciplinary learning modules with transversal competences at least once a year in all schools and all grades.
- Shifts towards self-assessment and peer-assessment (assessment as learning) and learning how to give feedback.

WHAT DOES THE NATIONAL CURRICULUM MEAN FOR SCHOOLS?

The national curriculum defines seven transversal competences that need to be developed in all schools in Finland. The transversal competences reflect competence definitions from different institutions and organisations globally. These have been adjusted to the best Finnish educational traditions. There is clear inspiration from the European Union's key skills (2005), OECD's key competences (2005) and work life's key competences (ITTF 2011). The background of the transversal competences lies within a wider framework of future skills and competences (Luostarinen and Peltomaa 2016, p. 50).

Transversal competences and project-based learning:

From the point of view of a teacher, the biggest change that the new curriculum brings is that the overall goal for basic education focuses on the learning of *transversal competencies*. This means that knowledge, skills, values, attitudes and will are seen holistically and it is understood that all of these have a fundamental impact on learning. Personal growth, studying, work life and being a citizen require know-how that surpasses the limits of individual subjects.

One notable way to practice and enhance transversal competences is through project-based learning. This means studying various real-world phenomena in groups or teams and making sure that through these phenomena that multiple subjects are touched upon. Katariina Salmela-Aro, Professor, Department of Education, University of Helsinki, has studied student's attitudes towards school and written about 'boredom' felt

towards school. The group of students who feel often bored at school are those young people who feel that they do not get enough challenges at school and also that the school system and the rest of their lives are disconnected.

Teamwork, an integral part of project-based learning, also gives children a chance to practice their interaction skills to help them identify, develop and exploit their strengths. According to the curriculum, each student has to have a project-based learning module at least once a year. What this means more concretely is to be more clearly defined by individual municipalities.

A project-based approach also significantly adds co-operation possibilities between teachers, which is another objective of the new curriculum. The underlying philosophy in project-based learning is that studying strictly unattached subjects is artificial and does not prepare children to both face and deal with real-world challenges. This does not have to mean solving highly complex challenges like climate change and poverty, but rather everyday life situations that require an understanding of how different systems relate to each other.

One year ago, the author participated in an event hosted by a group called Systems Thinking Applied. The purpose of the event was to experiment with what project-based learning actually means. During the event, the organisers acknowledged that project-based learning and teaching raises a lot of interest as well as puzzlement among teachers. The question of how you can teach project-based learning if you have never tried it yourself was one motivating factor behind the event (Honkonen and Lehmuskoski 2015).

To that end, people at the event came up with different phenomena that they were interested in and then organised themselves into small groups based on interest to research these phenomena further. Some findings from this experiment were:

- No one has the right answers: neither the students, nor the teacher! Project-based learning then, means the willingness to act with uncertainty. More than teaching, it is about guiding a learning process.
- Scoping the phenomena is challenging. Hypotheses or propositions that are too wide in scope can lead to individuals who are unmotivated. Conversely, a too narrow scope for a project can lead to a situation where valuable insights are left out.

- Difficult phenomena are easier to understand when you can connect them to your everyday life. (2015)

The Ritaharju school in Oulu, Finland wanted to experiment with project-based learning for a week as a part of Sitra's New Education Forum in 2015. The principal of Ritaharju school, Pertti Parpala, desired project-based learning to be tightly interlinked with a bigger change in school culture that needs to take place in Finnish schools. 'Co-operation, openness and trust among teachers are central for developing a school,' states Parpala (Pertti Parpala, <https://www.sitra.fi/blogit/viikko-ilman-luokkarajoja/>).

At Ritaharju, the pupils got to choose phenomena they wished to work with during the experiment week. It is argued here that this should be the starting point for project-based learning in order to motivate the pupils. Of course, there can be some guidance or overarching theme to further help or direct the pupils. At Ritaharju, the eighth-graders needed to choose a phenomenon related to Europe and more precisely to equity, sustainable development, media literacy, multi-literacy and inclusiveness. Examples of phenomena that the eighth-graders chose to study:

- Auschwitz and Birkenau
- Food culture in Germany, Finland, Spain and Turkey
- Historical eras of European art and music

Outi Ruotsala, the principal and teacher at Raattama school in Lapland, states that in Kittilä municipality, the theme of the first project-based learning module is 'I am a Kittilä resident' (Outi Ruotsala, personal communication, August 30, 2016). As the module title suggests, the young pupils concentrate on researching what it means to be a Kittilä resident with the help of their own experiences. All of the schools in Kittilä will have the same theme and at the end of the project-based learning module there will be an event for all schools where the work the children have completed will be presented. Ruotsala is planning to use photography with the pupils, but she adds that the learning module needs to be planned together with the children as the new curriculum suggests.

At Simpele school, located in Rautjärvi in Eastern Finland, the theme of the first project-based learning module will be 'Finland 100 years,' according to the principal Janne Hirvonen because Finland is celebrating its 100th Anniversary of Independence in 2017. As a second option, Simpele had also thought of a theme focused on local issues similar to

the school in Lapland. Likewise, Laihia school in Western Finland has also chosen a local theme for its first project-based learning module.

Aki Luostarinen and Iida Peltomaa wrote in their book *National Curriculum—Implementing Recipes for Teachers 2016* (the author's English translation), that using transversal competences as the base for education has two grand goals. Firstly, one cornerstone is to support student's growth as a human being by finding ones' own place and strengths in life. Secondly, it is about growing to become a member of society in its fullest meaning. The overarching goal is to evoke a desire in a student to be part of building a sustainable future. There needs to be competence building to secure that everyone has sufficient knowledge and skills to participate in society's decision-making and other activities (Finnish National Board of Education 2016; Luostarinen and Peltomaa 2016, p. 49).

DIGITALISATION

Bringing digitalisation, digital learning methods and coding, for example, more strongly into the school eco-system, is one of the aims of the new curriculum. It is a widely discussed topic more generally in Finnish society. The program of Prime Minister Sipilä's government that became effective in May 2015 has five key objectives, one of which has to do with education, learning and competences. One of the main objectives is that Finnish schools take a so-called 'digi-jump' so that digital learning materials and platforms would be incorporated into wider use. According to a widely cited European Commission report³ on Finland, only every fifth Finnish student uses ICT-technologies daily in school.

The Sipilä administration's key program has received criticism because the government simultaneously carried out substantial cuts to the overall education budget. There are also commentators suggesting that the current situation appears to be that a school gets iPad's, but no instruction in how to utilise them in the classroom or do not have any e-books or other materials to support digital learning. Digitalisation in recent years in Finland seems to be both a buzzword and a simplistic answer for everything, and that continues to create irritation and disillusionment for many in the education community.

When interviewing several school principals, they pointed out that focusing on digital learning is one of the key challenges for their school. Principal Ruotsala shared, 'I have to admit that the world of iPad's is

quite unfamiliar to me, but I see the objectives of the new curriculum as an opportunity for myself also to learn together with the students' (Outi Ruotsala, personal communication, August 30, 2016). Adds Principal Hirvonen, 'There's a couple of teachers in my school who have entirely given up books and use only digital learning materials. For me, it's no problem to admit that many students are far more competent in using the devices than me and can teach me. For some teachers this is a challenge to admit that a child knows something better than you. They are scared that they lose their authority' (Janne Hirvonen, personal communication, August 31, 2016).

ASSESSMENT

The new national core curriculum supported by Finnish law, states that verbal assessment can be used in grades 1–7. Numerical assessment should be started at the latest at 8th grade. The decision regarding when the numerical assessment begins is made at the local level in municipalities. Progressive Finnish teachers have even promoted the idea of giving up numbered assessments in order to make sure that no student feels they are below standard in certain subjects. The curriculum states:

School affects substantially in what kind of perception students have on themselves as both a learner and a human being. Especially significant is the feedback students get from their teacher... Good collaboration with parents is part of a good assessment culture... Students and their performance are not compared to each other and assessment does not concern student's personality, temperament or other personal attributes. (Finnish National Board of Education 2016)

The objectives for an assessment culture are outlined in the curriculum:

- Encouraging atmosphere that supports all students to 'have a try'
- Versatile assessment methods
- An assessment culture that supports students' inclusiveness and dialogue
- Supporting students to understand their own learning and to make the progress they are doing visible to them
- Ethicality and fairness
- Using the information that assessment gives to develop teaching

Principal Ruotsala from Raattama School states that after reading the chapter from the curriculum about assessment, its full meaning was still unclear to her. She understood assessment to be about constructing and encouraging feedback that helps the student to move forward in their learning and to recognise their strengths and places for development. However, Ruotsala says, it is extremely important that the joy gained in learning is not 'killed' by a number (Outi Ruotsala, personal communication, August 30, 2016).

Sanna Schöning, a principal from Laihia in western Finland, is of the opinion that assessment should not be forgotten, and that now with the new curriculum, new ways of assessment are being implemented. In practice, this means self-assessment, peer assessment and discussions with parents and the child about all aspects of learning and development (Sanna Schöning, personal communication, August 25, 2016).

BECOMING SUSTAINABLE CITIZENS

One of the seven defined areas of transversal competences in the curriculum is about learning to live in a sustainable way. Niina Mykrä, Ph.D. researcher and executive director for LYKE-network (a supporting network for nature, environment and sustainable lifestyle education) has analysed the curriculum from the point of view of environmental education. Mykrä found that climate change is mentioned only four times in the entire 500-page document. Still, it has to be acknowledged that in the value base for basic education, it is quite heavily emphasised that eco-social well-being means an understanding of how significant the threat of climate change is for humanity and that learning to live in a sustainable way includes understanding many aspects, with climate change representing one of them.

Former school principal, Counsellor of Education and author Martti Hellström, has analysed the feedback that educators and other interested individuals gave to the Finnish National Agency for Education during the first phase of commenting on the curriculum in 2014. The commentators were supporting the future-orientation and the content descriptions of transversal competences. What was seen as lacking at that point was entrepreneurial education and entrepreneurial skills. Sustainable development, environmentalism and global thinking were also seen as areas that needed to be substantially strengthened in the curriculum. Irmeli Halinen, says that these topics were given more emphasis as a

result of the opinions expressed during the commenting phase (Irmeli Halinen, personal communication, February 2016).

Niina Mykrä expresses the opinion that, all in all, the curriculum for basic education is excellent from the point of view of sustainable lifestyle and environmental education, since a sustainable lifestyle is seen as the base for critical thinking, education and the whole curriculum. If this curriculum will be implemented in practice, the understanding by the young generation with regards to the preconditions of sustainable future is strong, Mykrä believes (Niina Mykrä, personal communication, February 2016).

Other principals who were interviewed for this case study also said that they appreciated the future-orientation of the curriculum, but when the author asked them what was most valuable for them in the new curriculum, no interviewees mentioned the focus on a sustainable lifestyle. It remains to be seen how the grand goals of the curriculum such as sustainability transfer to everyday school-life.

A PRINCIPAL'S THOUGHTS ABOUT THE NEW CURRICULUM

The school principals interviewed for this case study hail from diverse geographical regions of Finland to help achieve a fuller picture of how the national curriculum is perceived in different parts of the country. The distance from Lauttasaari school located in the capital Helsinki to Raattama school located in Kittilä, is around 1100 kilometres. These two schools differ from each other in various ways. At Lauttasaari school, there are more than 800 pupils and it is the biggest K-12 school in Helsinki. At Raattama school, there are 6 pupils and one teacher, Outi Ruotsala, who is also the school's principal (Fig. 13.2, 13.3).

When the author traveled to Raattama school in the far north of Finland, together with the principal Outi Ruotsala, we saw only one car, the post car. The quietness and peacefulness is astonishing for someone like the author who lives in Helsinki. Raattama has around 150 inhabitants. The main sources of livelihood are reindeer ranches and seasonal work at the nearby skiing centres. During the research the author wanted to find out what the school principals thought about the curriculum process and its contents. Questions, for example, included: how does the new curriculum affect the school work in practice and what does the curriculum mean for the school?



Fig. 13.2 All of the student's desks at Raattama school in Lapland, Finland

On a beautiful day in May 2016, the author visited Lauttasaari school located on a residential island in western Helsinki. Entering the school yard, the pupils were having their afternoon break and one of the teachers were serving the pupils ice-cream. Everything was so idyllic, that it made the author rather nostalgic for her own school days.

Johanna Honkanen-Rihu, the principal of Lauttasaari school, was feeling relieved. Her school had, just the day before, sent their schools final version of the curriculum to the Helsinki City education department. The process of formulating the curriculum took 2.5 years. Honkanen-Rihu can claim a long career in the field of education, first as a teacher and then as a principal in three different schools in Helsinki. She has participated in all of the national curriculum processes in Finland.

The City of Helsinki education department provided schools with the frameworks and guidelines to help them develop their own school-based curriculum. That said, the teachers at Honkanen-Rihu's school were a little bit hesitant to start the curriculum work because of the additional

workload. Honkanen-Rihu, however, convinced the teachers that the in-depth discussions about the value base of education that the school provides, plus the myriad goals and objectives for learning and other curriculum related matters, would help their school to become a considerably better institution for both learning *and* teaching.

This seemed to be the case in all of the schools covered in this case study. The principals described a situation whereby due to the heavy workload that the curriculum process created, the teachers were not too eager to start the work. All of the cities in Finland seemed to have a similar working style with regards to the curriculum preparations: each teacher participated in one sub-working group. The theme of the sub-working group was either a school subject or related to the transversal competences or value base of the curriculum. Furthermore, the municipalities had somewhat different resources to invest in the curriculum work. A few municipalities had the financial budget to allow the hiring of a curriculum coordinator.

The process of translation from the national level to a local and even school level creates ownership and investment in the core principles. “The curriculum is something that is built together with your colleagues. Everything we do is based on the curriculum,” comments Honkanen-Rihu (Johanna Honkanen-Rihu, personal communication, May 24, 2016).

Outi Ruotsala from Raattama school, describes the process of creating the local curriculum in rather a different tone: “The process itself was quite disorganised. There were several months of meetings that were of no use because no one knew what to do. I was trying to find some instructions from the internet in order to make the work we were doing consistent between different subjects, but I did not find anything. We even had a joke that someone knows what we should do, but they just won’t tell us.” Despite the difficulties that occurred during the local curriculum process, Ruotsala states that many teachers were enthusiastic about the new curriculum. “It is almost like there is now permission to do things differently in school,” Ruotsala opines (Outi Ruotsala, personal communication, August 30, 2016).

From the authors perspective, it seems that the way in which the Finnish National Agency for Education gave freedom to the municipalities, cities and individual schools to define the curriculum themselves, embodied the spirit of the new curriculum; learning transversal competences to cope and thrive in a complex society and world.



Fig. 13.3 Students at the Raattama school in Lapland, Finland

That said, teachers seemed to hope for some structure and guidance. They wanted to know that they were doing the right thing and that they were providing equal learning possibilities for every child.

When the author visited Saunalahti school to interview the principal Hanna Sarakorpi, there was a palpable sense of her passion for her work when she spoke about the practices in her school. On the walls of her office she had old Finnish poems that described the uniqueness of every child. The school is located in Espoo, which is a 250,000-strong residential city located next to the capital Helsinki.

Saunalahti school has been the focus of numerous magazines and articles around the globe because of the progressivity of both the architecture and surroundings of the school and the pedagogics. Sarakorpi is of the opinion that the new curriculum challenges every school in Finland to take a new perspective, for example, on the role of the students themselves. The majority of schools are located in small cities and municipalities.² There are many schools in Finland that have not yet reached the

former curriculum cycle objectives, Sarakorpi states (Hanna Sarakorpi, personal communication, May 24, 2016).

SCHOOL CULTURES SUPPORT (OR DO NOT SUPPORT) THE IMPLEMENTATION OF THE CURRICULUM

This brings this case study to the theme of actually implementing the curriculum i.e., in terms of bringing the policy to life in classrooms around the country. Most teachers support the contents of the curriculum and appreciate the future-orientation of the document, but what they yearn for is support to help with the implementation—namely how to make the curriculum’s progressive principles a reality in classrooms around Finland. Aki Luostarinen and Iida-Maria Peltomaa write in their book that the most essential part of the whole process is that the professionals in the field do not allow the curriculum to become simply just paperwork with no genuine links to the classrooms (Luostarinen and Peltomaa 2016, p. 28).

Hannu Simola, Professor of Education Sociology at the University of Helsinki, writes in his book *The Finnish Education Mystery: Historical and Sociological Essays on Schooling in Finland*, about the prerequisites for school reform projects to succeed. These are: a majority of the teachers, students and parents in every school have to understand what the reform is about and accept it; the reform has to somehow fit into the school’s institutional practices and traditions, i.e., the reform has to be designed so that the school is able to implement it. The reform also has to open up new societal learning possibilities for the students. Simola adds that only when the school is understood as a historical, political, cultural and social institution, it becomes possible to change it (Simola 2015).

Education manager Tuija Viitasaari, and director of early childhood education and basic education, Kristiina Järvelä, from the City of Tampere education department, state that the culture inside a school defines how the curriculum is perceived and ultimately how it is practiced. The school culture largely determines if the new curriculum is perceived as a threat, an opportunity, something to get excited about or simply another additional burden. The key themes for curriculum work from the school’s point of view are participation, creating a sense of belonging for students, and strengthening the interaction between

school and other parts of society (Kristiina Järvelä, Tuija Viitasaari, personal communication, January 2016)

Both Honkanen-Rihu and Sarakorpi highlight the same challenge in curriculum implementation in their schools, as the Finnish National Agency for Education has taken up as a challenge for Finnish schools: strengthening students' agency and role as learners responsible of their own learning. The teachers' roles have traditionally been one of control and power. Shifting into a different kind of role of a coach or guide, or less hierarchical style 'educator' that supports children to find their own ways of learning requires a considerable amount of 'unlearning' and the willingness to change.

Another challenge regarding the teacher's role, is persuading teachers to work collaboratively in teams. The lack of a team-centric approach may well be seen as a byproduct of high teacher autonomy. That said, the objectives of the new curriculum cannot be met without teachers working together. This, needless to say, will prove to be difficult for those Finnish teachers who are used to doing everything on their own. However, the interviewees for this case study revealed that the teacher's role and school culture are slowly changing to a more communal way of working. In some schools, teachers already work in pairs or in small groups.

PEDAGOGICAL LEADERSHIP NEEDED

Despite the challenges, a distinctive success factor of the curriculum and the Finnish school system, in general, is the bottom-up culture that allows new practices to scale up from individual teachers classrooms to the level of an entire school. In principle, anyone from the community can influence the development of the school.

It is the opinion of principal Sarakorpi that in addition to the co-creative working style of the whole school community, a strong pedagogical leadership is needed at the implementation phase of the curriculum. States Sarakorpi, "The new curriculum challenges teachers and principals to develop a more student-centric school where students really feel like they are valued. This means that we should really put some attention to how children and adults in the school interact with each other" (Hanna Sarakorpi, personal communication, May 24, 2016).

Sanna Schöning is one of the three principals in Laihia, a municipality with 8000 residents. She states, “The effects of the new curriculum on schools is big and thus it has created all the elements of a change process: resistance to change and being skeptical if the new curriculum can bring anything valuable or new to schools.” Schöning continues that her strategy was to give space to these feelings and engage in discussion related to them:

The concepts from the curriculum have to be brought to the teacher’s room step by step. We need to constantly keep up the discussion, otherwise nothing is going to change. It requires a little bit of a shaking up of the status quo and a small amount of anxiety is natural in this process. It means that change is actually about to happen.

We started having conversations about the concepts of the curriculum already early on in the process. I gave teachers homework. We, for example, read various chapters from the curriculum and had pedagogical discussions about the texts. I also asked teachers to present to others what was the most important part of the curriculum to them, and how they wanted to practice it. This exercise really opened up the imagination of the teachers when they heard what their colleagues valued in the curriculum and why. (Sanna Schöning, personal communication, August 25, 2016)

Outi Ruotsala makes a valued point that the culture and community of teachers is different in each school. She has negative experiences from her previous career in certain schools where doing things in a new way were ‘prohibited’. “Everything had to be done like it always had been done. You have to be a real pioneer in order not to give in under the group pressure found in these kinds of schools,” Ruotsala states (Outi Ruotsala, personal communication, August 30, 2016).

CONCLUSION

Among Finnish teachers there is a joke that if you want to hide a 500 euro note, hide it between the pages of the national core curriculum, because no one ever opens or reads it. The joke is at least partly challenged by the over two-year co-creational process of building the Finnish national core curriculum in 2014. The aim of the Finnish National Agency for Education was to make teachers, principals and other stakeholders experts on the contents of the curriculum.

The national core curriculum has ambition, progressive content and it provides support and momentum for schools to renew or develop their pedagogies and practices. What is now needed is the courage to act and implement, as well as commitment and pedagogic leadership. The school principals' role in creating the settings for the curriculum to start emerging in practice is important. They need to be enabling leaders who support the whole school community to make a shift toward more collaborative ways of working with the community and society, more collaboration between the teachers and between parents and schools and strengthening students' agency.

There are variations in terms of the levels of commitment and implementation in schools across Finland and even among cities. Even so, it still has to be acknowledged that when looking at global comparisons, the Finnish school system is uniform and equal. There are still those taboos, like teachers' fixed working hours, that do not allow for much development work and that creates an incentive for teachers to defend the amount of teaching hours their subject gets in the curriculum. This is especially true in secondary schools. This is not the easiest starting point for project-based learning approaches. That said, it is now defined in the curriculum that every Finnish student needs to have one project-based learning module a year.

The curriculum states that personal growth, studying, work life and being a citizen require know-how that surpass the limits of individual subjects. The overall starting point of updating the curriculum has been a deep understanding of our rapidly-changing society and the demands that this puts on the individuals and society both from the point of view of skills and character. This understanding has created an encouraging atmosphere for discussions of the purpose of schools and education, values and principles.

The curriculum has enabled change to start emerging. One sign of this are increasingly common questions by the media that focus on the teacher's current and future role—questions that, amongst others, postulate whether teachers are truly allowed to be 'teachers' anymore when they have to be more like guides and co-learners. It is likely to be a much-debated question in the years to come and clearly reveals that the implementation of the new national curriculum then, has unequivocally begun to challenge conventions.

Information Box 1: A Teacher Explains: The Curriculum as a Tool for Teachers

School principal Pekka Rokka, now retired, writes in the foreword to his dissertation (2011) about his professional journey with the national curriculums of 1985, 1994 and 2004. In his dissertation he studied, with the help of these three documents, how schools integrated students into society, what kind of civic and societal skills and knowledge students learned, and what kinds of political themes were to be found in the curriculums from different decades. Rokka writes that national curriculums can be considered ‘bibles’ to teachers. “In my daily work as a teacher, I felt that the curriculum is the document that gives ground to my whole work and for my role as a teacher,” (translation by author) he states (Rokka 2011, p. 3).

Rokka posits that the curriculum of 1994 was a radical event in the education field in Finland because each school was supported to produce their own curriculum. This made it possible to do in-depth development work in schools and it made many schools able to take steps forward in their pedagogical and operational practices. Conversely, the curriculum of 2004 felt like a step backwards because it was not as co-creational as the previous one, Rokka explains. The work consisted of reading and commenting on material that others had written, but the deep participation was not there. The core curriculum of 1994 was school-specific, but there was little space for school-specificity in the core curriculum of 1985 and 2004. The core curriculums are guided by pendulous policy since the openness of the curriculum of 1994 was returned back into a more restrictive policy in 2004 (Rokka 2011, p. 9).

Rokka states that individuality, consumer citizenship, entrepreneurship, integration, internationality, the future and encountering the future, emphasis on equity, information technology and technology, effectiveness of media, youth culture, concern for the environment and nature, healthy life and safety awareness, as well as the assessment, development and effectiveness of education, all emerge as central political themes in national curriculums (2011).

Information Box 2: Me & My City—Learning by Doing

Me & My City is a Finnish learning concept for 12-year olds (6th graders) and 15-year olds (9th graders) developed by a former teacher, Tomi Alakoski, and his colleagues. The goal is to give the students the opportunity to develop their understanding of the economy, society, working life and entrepreneurship and transitioning to a circular economy and to strengthen their preparedness in these areas. Me & My City has operated for since 2010 in different cities in Finland. During that time around 250,000 students have visited Me & My City reaching around 75% of the 6th graders and around 40% of the 9th graders in Finland. In 2017 Me & My City started a big collaboration with the Finnish Innovation Fund Sitra. Me & My City concept is updated so that it simulates the kind of sustainable practices needed in the future societies. In this circular economy and sustainable business models are emphasized.

Me & My City is organised by the Economic Information Office (TAT) and funded by the Ministry of Education, The Finnish Innovation Fund Sitra, companies, municipalities and foundations. The learning environment created by Me & My City simulates a city with a post office, city hall, supermarket, local newspaper and businesses. The goal is to give children a learning experience that is rooted in the everyday-life practices and operations of society. For one day, the young students work in different positions in the city and have tasks that they are responsible for. The pupils generate an income from their job which they can use to purchase groceries or small items that they can take with them at the end of the day. The young students who work in companies have to consider the reputation of the company and the status of their corporate social responsibility strategy.

Before the day spent on site, teachers and students prepare for the experience by working through job applications, simulating job interviews, learning about the economy, taxation and more. The learning concept includes teacher training and learning materials for ten lessons. An important part of the concept is to develop collaborative skills, learn more about what it means to be a consumer and to deepen the students' media literacy.

Alakoski and his colleague, Minna Ala-Outinen, explain that one of the advantages of Me & My City is that it is made easy

for schools to participate. Schools are an institution often seen as an answer for many different kinds of developments in society and schools are contacted frequently by different kinds of organisations. Often it is not clear why the proposed project would be beneficial for the school. Me & My City does not have that problem since it has been designed to directly support the goals of the national curriculum.

There is a new Me & My City learning environment for 9th graders focused on the global economy. In this concept, 9th graders work as the board of directors of a Finnish multinational industrial company Metso. Alakoski and Ala-Outinen explain that it is interesting to see how Me & My City has an impact on different students and teachers. For one day, the teachers' role is simply to sit and watch how the students run the city. Often those lively students, who might have certain difficulties concentrating in the classroom, perform exceptionally well in Me & My City. The teachers are often astonished by how good these students are when they are in the right kind of learning environment. As a result, it is empowering for the 12-year olds as well as the 15-year olds to visit Me & My City. They are given responsibility and begin to understand their parents' world a little bit better. Ala-Outinen adds that Me & My City has made some teachers realise what kind of resource the parents, companies and other organisations could be for learning purposes. This way, Me & My City is bridging the gap between schools and the rest of the society (Tomi Alakoski, Minna Ala-Outinen, personal communication, May 2016).

QUESTIONS ASKED IN INTERVIEWS WITH SCHOOL PRINCIPALS:

- What does the curriculum mean for your school's strategic plan?
- What does the curriculum mean for your day-to-day work?
- How do your teachers react to and work with the curriculum?
- Do your staff feel like they have an ownership stake in the curriculum?
- What is the most innovative aspect of the curriculum?
- What needs more work?
- What part do you value the most?
- Should national education priorities be set in another way?

- Does the curriculum pull schools closer towards their purpose?
- How did you participate in the new national curriculum process?
- Do you feel that it is relevant for your school?
- What do you think about the value base in the new curriculum?
- How are you going to implement the new curriculum?
- What is going to change with this new Curriculum?

PEOPLE INTERVIEWED FOR THIS CASE STUDY:

- Irmeli Halinen, Head of National Curriculum Development, Finnish National Agency of Education (now retired)
- Arja-Sisko Holappa, Counsellor of Education, Finnish National Agency of Education
- Johanna Honkanen-Rihu, principal, Lauttasaari School, Helsinki
- Hanna Sarakorpi, principal, Saunalahti School
- Sanna Schöning, principal, Laihia School
- Janne Hirvonen, principal, Simpele School, Rautjärvi
- Outi Ruotsala, principal and teacher, Raattama School, Kittilä
- Education manager, Tuija Viitasaari, & director of early childhood education and basic education, Kristiina Järvelä, City of Tampere Education Department
- Executive director Tomi Alakoski & product manager Minna Ala-Outinen, Me & My City, Economic Information Office.

NOTES

1. The Finnish National Agency for Education (www.oph.fi) is a national agency that is responsible for the development of early childhood education and care, pre-primary, basic, general upper secondary, vocational upper secondary and adult education in Finland. The Finnish National Agency for Education is subordinate to the Ministry of Education and Culture and its tasks and organisation are set in legislation.
2. In 2016 there were 2339 schools in Finland. The figure also includes secondary schools.
3. European Commission report. <https://ec.europa.eu/digital-single-market/en/news/survey-schools-icteducation>.

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